THE

Journal

OF THE

AMERICAN OSTEOPATHIC ASSOCIATION

Volume Fifty-One

EDUCATIONAL NUMBER

Number 5 | 212 East Ohio St., Chicago 11, Ill. | January, 1952

New! Surgical Practice of the Lahey Clinic

This book is a detailed and well-illustrated description of the management of surgical patients at the Lahey Clinic today. While it is devoted mainly to actual operating room technic, it places a well-balanced amount of emphasis on diagnostic methods, selection of cases, pre- and postoperative care, anesthesia, etc. The recommendations are doubly valuable because they are backed up by reports of end results in long series of cases.

The 784 illustrations on 509 figures are models of clarity and instructive value. They show you, with unmistakable definition of detail, exactly how to do what the contributors tell you to do. Numerous X-rays are included. In fact, physicians will find that this new book is practically the equivalent of being "first assistant" in the Lahey Clinic amphitheatres.

By the Staff of the Lahey Clinic, Boston. 1014 pages 6½" x 9½", with 784 illustrations on 509 figures. $15.00. *New.*

W. B. SAUNDERS COMPANY • **West Washington Square, Philadelphia 5**

The Right Combinations in

BILE ACID THERAPY

Optimum purity of DOXYCHOL-K and DOXYCHOL-AS enables the physician to obtain predictable end results in bile acid therapy.

Both products represent truly therapeutic formulae, since the ingredients of each exert specific action, and are present in full therapeutic amounts.

DOXYCHOL-AS is indicated where initial treatment requires hepatic stimulation, plus spasmolysis and sedation.

DOXYCHOL-K is ideal for continuation therapy over prolonged periods. It contains no antispasmodic nor sedative, but provides the same quantities of unconjugated bile acids with identical hydrocholeretic effect.

DOXYCHOL-K TRADEMARK . . . Each tablet contains: Ketocholanic acids, 3 gr. (derived from oxidized pure cholic acid, and containing approximately 90% dehydrocholic acid); Desoxycholic acid, 1 gr.

DOXYCHOL-AS TRADEMARK . . . Each tablet contains: Phenobarbital, 1/8 gr. (Warning: May be habit forming); Atropine Sulfate, 1/400 gr.; Hyoscyamine Hydrobromide, 1/400 gr.; Desoxycholic Acid, 1 gr.; Ketocholanic Acids, 3 gr. (derived from oxidized pure cholic acid, and containing approximately 90% Dehydrocholic Acid).

Both products available in bottles of 100, 500 and 1000 tablets.

Write Dept. 13-M for literature

BREON

George A. Breon & Company

Manufacturing Pharmaceutical Chemists

1450 BROADWAY NEW YORK 18, N. Y.

PRACTICAL NEW BOOKS FOR THE OSTEOPATHIC PHYSICIAN

POSTURE AND PAIN

By Henry O. Kendall, Florence P. Kendall and Dorothy A. Boynton

Emphasizes the importance of postural faults in disabling and painful conditions; reduces the complexities of postural analysis to the simplest forms; presents basic therapeutic procedures.

Clearly written, with all technical terms carefully explained, and extensively illustrated.

In 4 parts: *Alignment:* standard posture; postural faults. *Mobility:* joint and muscle analysis and relation to posture; tests for muscle length and strength; procedure for postural examination. *Treatment:* pain associated with faulty body mechanics; painful condition of low back, leg, knee, foot, upper back, neck, arm. *Prevention of Postural Faults:* developmental factors and environmental influences.
213 pp., 159 figs......*$7.00*

MODERN ELECTROCARDIOGRAPHY, Vol. I. The P-Q-R-S-T-U Complex

By Eugene Lepeschkin, M.D. Foreword by F. N. Wilson, M.D.

Gives you, with a minimum of time and effort, the ultimate in electrocardiographic knowledge, classified and interpreted according to the latest scientific standards.

Reconciles and combines contrasting schools of thought into a single system of electrocardiography.

Completely covers the literature of the last 15 years in a bibliography of more than 9000 items.

Clarifies the problems and answers the questions that arise in your daily use of electrocardiography.
612 pp., 91 figs......*$12.00*

TEXTBOOK OF CLINICAL PATHOLOGY, 4th edition

Edited by Seward E. Miller, M.D. (formerly edited by Roy R. Kracke and Francis P. Parker)

Completely redesigned fourth edition provides you with one authentic source of basic scientific information.

Tells you how to use the clinical laboratory to best advantage: what tests to order, how and when to order them, and how to interpret and evaluate the results.

Portrays step by step only those portions of clinical laboratory procedure usually performed by the practicing physician, omitting detailed description of highly technical procedures.
1077 pp., 203 figs., 44 plates, 34 in color....*$9.00*

THE CHILD IN HEALTH AND DISEASE, 2nd edition

Edited by Clifford G. Grulee, M.D., and R. Cannon Eley, M.D.

The newest and most up-to-date text in the pediatric field, with 200 more pages than the first edition, 2 more color plates, 109 new figures, and 8 new chapters.

New subjects in this edition include adoption, medical supervision of summer camps, cardiovascular surgery and viral hepatitis. Separate chapters cover erythroblastosis fetalis and pancreatic fibrosis.

Each chapter written by an expert in his special field, well organized and carefully edited by two outstanding authorities.
1240 pp., 333 figs., 9 in color,
4 color plates.....*$15.00*

THE WILLIAMS & WILKINS COMPANY

Mt. Royal and Guilford Aves. Baltimore 2, Maryland

CONTENTS, JANUARY, 1952

ORIGINAL ARTICLES—

Osteopathy and the Treatment of Acute Diseases. A. Reid Johnston, D.O., Hamilton, Ont., Canada....247

Distinctive Osteopathic Management of the Convalescent Period. Ray A. Linnen, D.O., Ottawa, Ont., Canada....251

Coronary Accidents and Their Diagnosis and Treatment. Earl E. Congdon, D.O., Flint, Mich. 254

Complications of the Distorted Bite. C. Paul Snyder, D.O., F.O.C.O., D.Sc. (Ost.), Philadelphia 257

With a Section on Fascia of the Head and Neck. Angus G. Cathie, D.O., Philadelphia 260

Reflexes in the Newborn Infant. Arnold Melnick, A.B., M.A., D.O., Philadelphia, and George H. Guest, D.O., Philadelphia 262

Postoperative Pulmonary Infarction. An Analysis of Contributing Factors. Joseph E. Giletto, D.O., Yeadon, Pa....265

EDITORIALS—

The Profession, Midyear....269

Atherosclerosis and the Aging Process....270

DEPARTMENT OF PUBLIC AFFAIRS—

Bureau of Public Education on Health: Examining and Licensing Boards....272

BOOK NOTICES 273

EDUCATIONAL SUPPLEMENT—

Osteopathic Education. Lawrence W. Mills, Chicago 277

Student Selection at the Chicago College of Osteopathy. Walter C. Eldrett, D.O., Chicago 280

Registry of Osteopathic Hospitals....289

CONVENTIONS AND MEETINGS....ad p. 41

STATE AND NATIONAL BOARDS..ad p. 49

BOOKS RECEIVED ....ad p. 69

AUTHOR AND SUBJECT INDEX

Accident prevention and housing design, public health consideration on, [Kent and Pond] ....ad p. 52-Ex.

Adoption:
if a baby is to be adopted, how early should we place him in his new home? [Fairweather] ....ad p. 55-Ex.

Age: See also Old Age
and occupation ....ad p. 63-Ex.
many people still die prematurely..ad p. 59-Ex.

American Osteopathic Association: See also Membership, A.O.A.
the profession, midyear (December Board of Trustees meeting)....269-E

Atherosclerosis and the aging process....270-E

Birds, wild, isolation of encephalitis virus from 268

Bite, distorted, [Snyder], with a section on fascia of the head and neck, [Cathie]..257*

Book Notices:
The Facts of Life from Birth to Death. Louis I. Dublin....273-BN
An Atlas of Normal Radiographic Anatomy. Isadore Meschan....273-BN
Therapy of Dermatologic Disorders. Samuel M. Peck and George Klein....273-BN
Growth and Development of Children. Ernest H. Watson and George H. Lowrey 274-BN
Textbook of Biochemistry. Edward Staunton West and Wilbert R. Todd 274-BN
Human Biochemistry. Israel S. Kleiner 274-BN
The Great Medical Bibliographers. John F. Fulton 274-BN

Books received ....ad p. 69

Cancer, chances of developing....ad p. 62

Cathie, Angus G.:
Fascia of the head and neck....260*

Chicago College of Osteopathy, student selection, [Eldrett] 280-OE

Colleges, osteopathic: See Education, osteopathic; and under names of colleges

Congdon, Earl E.:
Coronary accidents and their diagnosis and treatment 254*

Convalescence, distinctive osteopathic management, [Linnen] 251*

Conventions and meetings....ad p. 41

Coronary accidents and their diagnosis and treatment, [Congdon]....254*

Death, many people still die prematurely ....ad p. 59-Ex.

Dentistry, complications of the distorted bite, [Snyder] 257*

Diseases:
acute, osteopathy and the treatment, [Johnston] 247*
distinctive osteopathic management of the convalescent period, [Linnen]....251*

Education:
osteopathic, [Mills] 277-OE
osteopathic, Educational Standards for Osteopathic Colleges 283-OE
osteopathic, student selection at Chicago College of Osteopathy, [Eldrett]....280-OE
osteopathic, supplement contributed by Office of Education of the American Osteopathic Association 275-OE

Eldrett, Walter C.:
Student selection at the Chicago College of Osteopathy 280-OE

Encephalitis virus, isolation from wild birds 268

Examinations: See State and National Boards

Fascia of the head and neck, [Cathie]....260*

Foster parents, income tax payments by ....ad p. 63-Ex.

Giletto, Joseph E.:
Postoperative pulmonary infarction; an analysis of contributing factors....265*

Guest, George H.: See Melnick, Arnold, jt. author

Head, fascia, [Cathie]....260*

Heart; coronary accidents and their diagnosis and treatment, [Congdon]....254*

Hospitals:
osteopathic, approved for intern training 289-OE
osteopathic, approved for training of residents 290-OE
osteopathic, registered 289-OE

Housing design and home accident prevention, public health consideration on, [Kent and Pond]....ad p. 52-Ex.

Income tax payments by foster parents ....ad p. 63-Ex.

Infants, newborn, reflexes, [Melnick and Guest] 262*

Infarction, postoperative pulmonary; an analysis of contributing factors, [Giletto] 265*

Johnston, A. Reid:
Osteopathy and the treatment of acute diseases 247*

Legal and Legislative:
examining and licensing boards....273-Pu.A

Licensure: See State and National Boards

Linnen, Ray A.:
distinctive osteopathic management of the convalescent period 251*

Lungs, postoperative infarction; an analysis of contributing factors, [Giletto]....265*

Maternity, the American mother....ad p. 60-Ex.

Melnick, Arnold, and Guest, George H.:
Reflexes in the newborn infant....262*

Membership, A.O.A.:
applications ....ad p. 65
changes of address and new locations..ad p. 64

Mills, Lawrence W.:
Osteopathic education 277-OE

National Board of Examiners for Osteopathic Physicians and Surgeons: See State and National Boards

Neck, fascia, [Cathie]. 260*

Occupation and age....ad p. 63-Ex.

Old age, atherosclerosis and the aging process 270-E

Osteopathy: See also Technic, Osteopathic
distinctive osteopathic management of the convalescent period, [Linnen]....251*
osteopathy and the treatment of acute diseases, [Johnston] 247*

Public health, consideration on housing and home accident prevention, [Kent and Pond] ....ad p. 52-Ex.

Reflexes in the newborn infant, [Melnick and Guest] 262*

Reregistration of Osteopathic Licenses: See State and National Boards

Snyder, C. Paul:
Complications of the distorted bite....257*

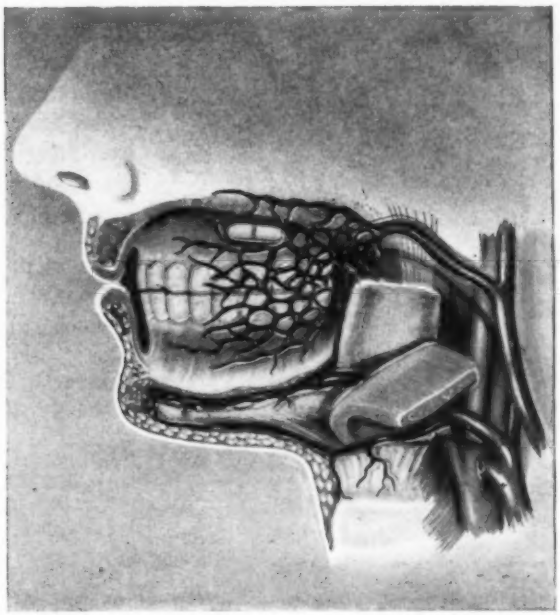
State and National Boards:
Alaska, Alberta, Ariz., Colo., Conn., Del., D. C. ....ad p. 49
Hawaii, Ill., Iowa, Kans., Mass., Minn., Mont., N. H., N. Mex., N. Y., Ore., Puerto Rico, Tenn., Wis. ....ad p. 50
examinations by National Board....ad p. 51
examining and licensing boards....273-Pu.A
reregistration of osteopathic licenses..ad p. 51

Surgery, postoperative pulmonary infarction; an analysis of contributing factors, [Giletto] 265*

Technic, Osteopathic:
complications of the distorted bite, [Snyder], with a section on fascia of the head and neck, [Cathie]....257*

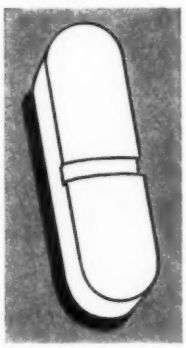
Ulbrich, A. P.:
Book notices 273-BN

Published monthly by the American Osteopathic Association. Office of Publication, 100 S. Kenilworth Ave., Oak Park, Ill. Address all communications to the Main Office at 212 E. Ohio St., Chicago 11, Ill. Subscriptions $10 a year. Acceptance for mailing at special rate of postage provided for in Section 1103, Act of October 3, 1917, authorized August 31, 1922. Entered at the Oak Park, Ill., post office as second class matter, April 1, 1926, under the Act of March 3, 1879.



"...approximately twice as potent per milligram..."

Metandren® Linguets®



"When administered as buccal or sublingual tablets, methyltestosterone was approximately twice as potent per milligram as unesterified testosterone..."*

Liver is by-passed as with injection

Metandren Linguets are potent therapeutically because they make possible the absorption of methyltestosterone directly into the systemic circulation. Placed in the buccal pocket or under the tongue, they are absorbed efficiently. Hence the body fluids and tissues become permeated with the hormone before hepatic degradation can take place. Metandren Linguets are supplied in potencies of 5 mg. (white) and 10 mg. (yellow) both scored.

*Escamilla, R. F. and Gordan, G. L.: J. Clin. Endocrinol. 10:248, (Feb.) 1950

Ciba *Summit, N.J.*

2/182096

METANDREN (BRAND OF METHYLTESTOSTERONE),
LINGUETS (BRAND OF WAFERS FOR MUCOSAL ABSORPTION)

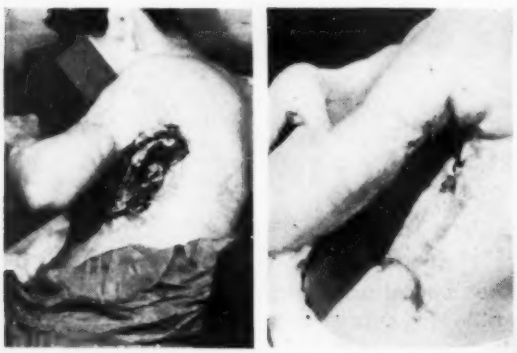
Outstanding results with Furacin

Reasons for the clinical effectiveness of Furacin® include: a wide antibacterial spectrum, including many gram-negative and gram-positive organisms – effectiveness in the presence of wound exudates – lack of cytotoxicity: no interference with healing or phagocytosis – water-miscible vehicles which dissolve in exudates – low incidence of sensitization: less than 5% – ability to minimize malodor of infected lesions – stability.

Furacin preparations contain Furacin 0.2% brand of nitrofurazone N.N.R. dissolved in water-miscible vehicles.

for example:

IN INFECTED LESIONS . . .



Progressive infection of a lacerated scar of the axilla had existed for ten years. All previous attempts to control this chronic infection had failed. Furacin Soluble Dressing brought the infection under control within one week.*

*Meyer, J. H.: J. Internat. Coll. Surg. 13:748 (June) 1950.

Literature on request

ACCEPTED COUNCIL ON PHARMACY AND CHEMISTRY AMERICAN MEDICAL ASSOCIATION

FURACIN
SOLUBLE DRESSING
N. N. R.
(BRAND OF NITROFURAZONE)
CONTAINS 0.2% NITROFURAZONE N. N. R. IN A WATER SOLUBLE BASE.
CAUTION: TO BE DISPENSED ONLY BY OR ON THE PRESCRIPTION OF A PHYSICIAN.
WARNING: THIS DRUG MAY CAUSE SENSITIZATION. IF THIS OCCURS, ITS USE SHOULD BE DISCONTINUED.
LITERATURE AVAILABLE TO PHYSICIANS ON REQUEST.
AN ANTIBACTERIAL PREPARATION FOR TOPICAL APPLICATION.
E·A·TON Inc.
NORWICH, N.Y.U.S.A.
ONE POUND. AVOIR.
453.6 GRAM.

The NITROFURANS

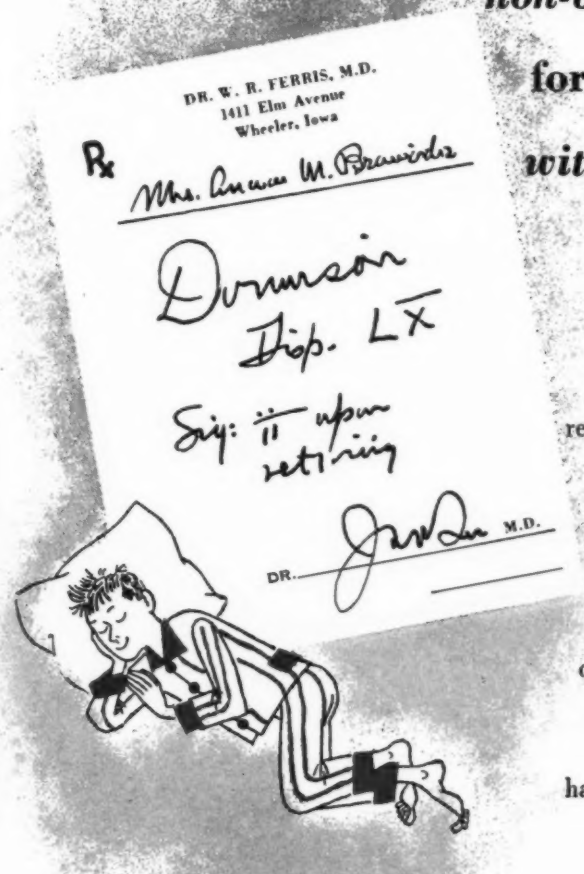
A unique class of antimicrobials

EATON LABORATORIES Inc.
NORWICH, NEW YORK

FURACIN SOLUBLE DRESSING • FURACIN SOLUTION • FURACIN ANHYDROUS EAR SOLUTION

For insomnia... *you can prescribe with safety*

DORMISON



***non-barbiturate* hypnotic**

for SAFE, SOUND SLEEP

without drug hangover

The extraordinarily wide margin of safety of DORMISON permits patients who awaken in the early morning and desire more sleep to repeat the dose. DORMISON is rapidly metabolized (one to two hours) so that there is no prolonged suppressive action. Patients awaken rested and refreshed as from normal slumber. DORMISON has no cumulative effect, no toxic effects on prolonged use. There is no evidence to date that DORMISON has habit-forming or addiction properties.

DOSAGE: Two 250 mg. capsules are recommended, although many patients respond to one.

DORMISON* (methylparafynol-Schering), capsules of 250 mg., bottles of 100.

*T.M.

Schering **CORPORATION,** BLOOMFIELD, N. J.

DORMISON

SCHERING

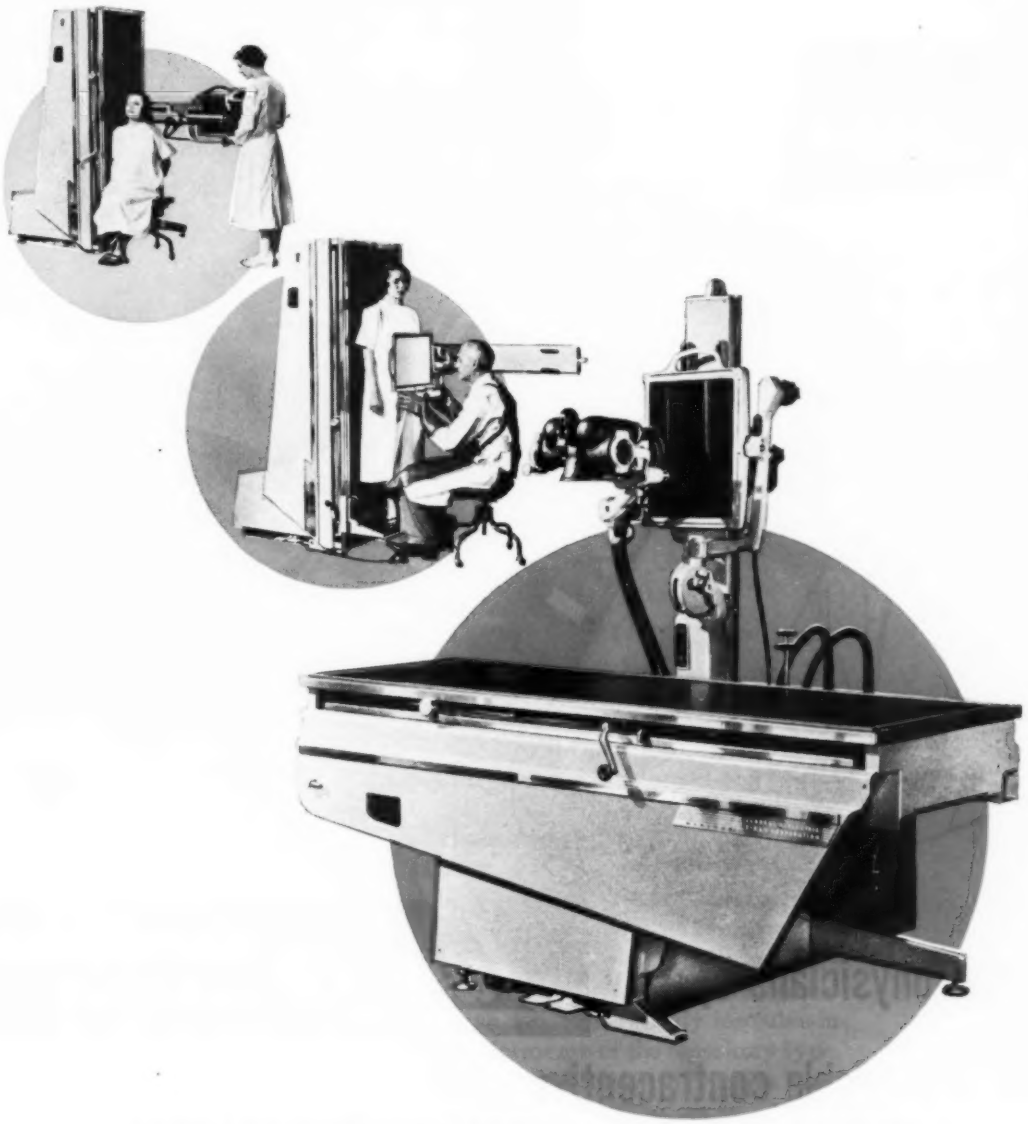
Phospho-Soda (fleet)®

—safe and effective whenever laxation is indicated

Phospho-Soda (Fleet) is a solution containing in each 100 cc. sodium biphosphate 48 Gm. and sodium phosphate 18 Gm. Both 'Phospho-Soda' and 'Fleet' are registered trademarks.

C. B. FLEET CO., INC.
LYNCHBURG, VIRGINIA

Accepted for advertising by the Journal of the American Medical Association



ONE TUBE DOES DOUBLE DUTY IN THIS MAXICON

Versatile is the word for this Maxicon. Capable of a wide range of diagnostic service, it has ample facilities for both radiography and fluoroscopy, horizontally and vertically.

Hand-tilt or motor-driven, the single-tube radiographic and fluoroscopic table is designed for operation with 100 or 200 ma generators. Its table-mounted tube stand makes it compact — ideal for small room.

See your x-ray representative or write X-Ray Department, General Electric Company, Milwaukee 14, Wisconsin. Dept. R-1.

GENERAL ELECTRIC

why *more* physicians specify Lanteen DIAPHRAGM and JELLY

for dependable contraceptive action

An ever-increasing number of physicians are specifying *Lanteen* whenever protection from pregnancy is considered advisable because:

UNIQUE FORMULA OF LANTEEN JELLY OFFERS CONTRACEPTIVE POTENCY-PLUS

Lanteen Jelly exerts the most rapid contraceptive action recordable by the Becker and Gamble tests. It combines widely accepted spermicidal agents with hexylresorcinol—a highly active spermicide which has been found to be a potent bactericide and one of the least toxic of the alkyl substituted resorcinols.[1] Lanteen Jelly is safe and actually soothing to sensitive membranes—remains stable at room temperature.

THE LANTEEN DIAPHRAGM AFFORDS EFFICIENT AND RELIABLE MECHANICAL PROTECTION

The flat spring rim of the Lanteen diaphragm, forged from the finest watch spring steel, is collapsible in *one plane only*—it firmly but comfortably holds the diaphragm in place regardless of changes in body position. The Lanteen diaphragm is easily placed without the aid of an inserter. Made of the highest grade natural unbleached rubber, the Lanteen diaphragm assures durability and dependable protection.

For added confidence in the contraceptive method you prescribe, specify Lanteen Diaphragm and Jelly—designed to provide maximal effectiveness with minimum inconvenience.

1. Leonard, V.: J.A.M.A., *83*:2005 (Dec. 20) 1924.

Lanteen Jelly contains: Ricinoleic Acid, 0.50%; Hexylresorcinol, 0.10%; Chlorothymol, 0.0077%; Sodium Benzoate and Glycerine in a Tragacanth base.

"Improved Method of Contraception"—22-page full color illustrated brochure free on request.

LANTEEN MEDICAL LABORATORIES, INC. • 2020 Greenwood Street • Evanston, Illinois

NEW SAFETY IN PENICILLIN THERAPY!

COMPENAMINE

A NEW HYPOALLERGENIC PENICILLIN SALT

Through the routine use of Compenamine, reactions to penicillin can be reduced significantly below that encountered with other available forms of penicillin G. This hypoallergenic characteristic of Compenamine permits its use even in known penicillin reactors; in this group it reduces the incidence of reactions by at least 80 per cent. Thus Compenamine brings new safety to penicillin therapy.

A research development of C.S.C. Pharmaceuticals, Compenamine is generically designated as *l*-ephenamine penicillin G. Its clinical behavior and therapeutic performance are identical, unit for unit, with comparable dosage forms of procaine penicillin. Nearly insoluble in water and oil, its dosage forms are of the repository type.

Compenamine is priced identically with procaine penicillin G. Hence economic considerations are no obstacle to its routine use.

C.S.C. Pharmaceuticals

A DIVISION OF COMMERCIAL SOLVENTS CORPORATION, 17 E. 42nd St., New York 17, N. Y.

THREE DOSAGE FORMS

COMPENAMINE IS CURRENTLY AVAILABLE IN THREE REPOSITORY DOSAGE FORMS:

- COMPENAMINE (for aqueous injection), in vials.
- COMPENAMINE AQUEOUS, in vials and disposable and permanent syringe cartridges.
- COMPENAMINE in PEANUT OIL, in vials and disposable and permanent syringe cartridges.

All Children Can Benefit from *this* Protective Hot Drink at Breakfast

In its widely distributed leaflet No. 268, "Eat a Good Breakfast," the U. S. Dept. of Agriculture states: "Summer or winter, there's something hot, as a rule, in a good breakfast. . . . Something hot is cheering and tones up the whole digestive route."

The problem of encouraging children to eat an adequately protective breakfast finds easier solution when Ovaltine in hot milk is recommended as a breakfast beverage. Many children clamor for a hot drink at the morning meal, and hot Ovaltine is the right kind of drink to recommend.

A cup of hot Ovaltine makes an excellent contribution of virtually all essential nutrients, adding substantially to the nutritional start for the day. It also serves in a gustatory capacity by enhancing the appeal of breakfast and making other foods more inviting.

The nutrient contribution made by a cup of Ovaltine is apparent from the table below. Note the wealth of essentials added to the nutritional intake by making the simple recommendation of adding a cup of hot Ovaltine to the child's breakfast.

THE WANDER COMPANY, 360 NORTH MICHIGAN AVE., CHICAGO 1, ILLINOIS

Ovaltine

Here are the nutrients that a cupful of hot Ovaltine, made of ½ oz. of Ovaltine and 8 fl. oz. of whole milk,* provides:

PROTEIN	10.5 Gm.	IRON	4 mg.	NIACIN	2.3 mg.
FAT	10.5 Gm.	COPPER	0.2 mg.	VITAMIN C	10 mg.
CARBOHYDRATE	22 Gm.	VITAMIN A	1000 I.U.	VITAMIN D	140 I.U.
CALCIUM	370 mg.	VITAMIN B_1	0.39 mg.	CALORIES	225
PHOSPHORUS	315 mg.	RIBOFLAVIN	0.7 mg.		

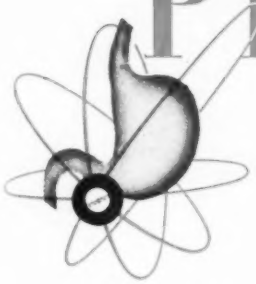
*Based on average reported values for milk.

selective
anticholinergic gives
unparalleled freedom from side effects

New

PRANTAL

Methylsulfate



for peptic ulcer

greater specificity
hitherto unobtainable freedom from side effects
wider flexibility of dosage
reduces gastric motility and secretion
relieves pain

PRANTAL* Methylsulfate is a member of an entirely new class of synthetic anticholinergic compounds. It curbs excessive vagal stimuli to the stomach by inhibiting synaptic transmission across parasympathetic ganglia.

PRANTAL Methylsulfate is unique among anticholinergic compounds. Because of its selective action, doses which reduce gastric motility and secretion rarely cause dilatation of the pupils, dryness of the mouth, urinary retention, or constipation.

The pharmacodynamics of PRANTAL Methylsulfate have been the subject of extensive laboratory investigations in which the classical procedures were used. Studies by leading clinical investigators have confirmed the value of its unusual properties in treatment of the peptic ulcer syndrome.

A Clinical Research Division monograph is now in press and will be sent to you promptly on request.

A clinical supply of PRANTAL Methylsulfate will be sent to you on request.

Average Dosage: One tablet (100 mg.) four times daily.

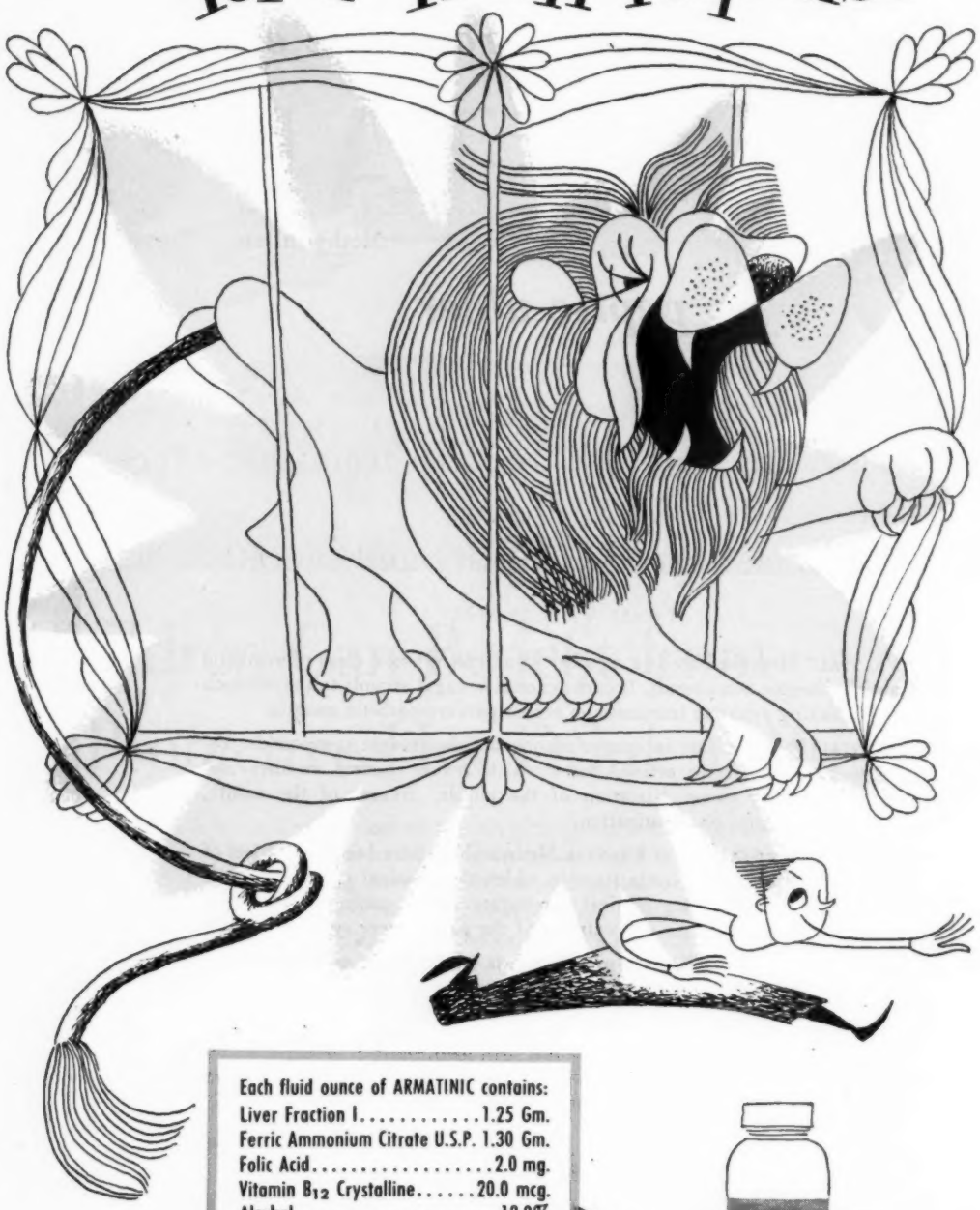
Packaging: PRANTAL Methylsulfate (brand of diphenmethanil methylsulfate), 100 mg. scored tablets, bottles of 100.

*T.M.

PRANTAL

Schering CORPORATION • BLOOMFIELD, NEW JERSEY

for a fresh response ·



Each fluid ounce of ARMATINIC contains:

Liver Fraction I.....1.25 Gm.
Ferric Ammonium Citrate U.S.P. 1.30 Gm.
Folic Acid.....2.0 mg.
Vitamin B_{12} Crystalline.....20.0 mcg.
Alcohol.....12.0%

Supplied in 8 oz. and 16 oz. bottles at prescription pharmacies everywhere.

Armatinic Activated Capsulettes
Also available in bottles of 100 and 1000.

. . . and a refreshing taste

armatinic

the new LIQUID hematinic

For the many anemic patients who show poor response or complete refractoriness to iron, liver or vitamin B_{12} alone, Armatinic offers a fresh, vigorous hemopoietic response.

Armatinic—a new product of The Armour Laboratories—provides critical factors for an effective hemopoietic response. Armatinic is well tolerated . . . pleasant-tasting . . . economical . . . and may be given to children as well as to adults. This comprehensive approach to blood regeneration produces gratifying and prompt improvement in the blood picture and in symptomatic manifestations.

IN ANEMIA: All hypochromic anemias from pediatrics to geriatrics, macrocytic anemias of nutritional origin, macrocytic anemia of pregnancy, macrocytic anemia of sprue.

THE ARMOUR LABORATORIES
CHICAGO 11, ILLINOIS
world-wide dependability
PHYSIOLOGIC THERAPEUTICS THROUGH BIORESEARCH

PEPTIC ULCER

AND

GASTRIC HYPERACIDITY

Rx—Cereal Lactic (Antacid and Adsorbent)

Our Cereal Lactic basic culture contains LACTOBACILLUS ORGANISMS—plus the following enzymes:

Maltase
Invertase
Diastase
Lactase
Lipase
Protease
Oxidase
Reductase

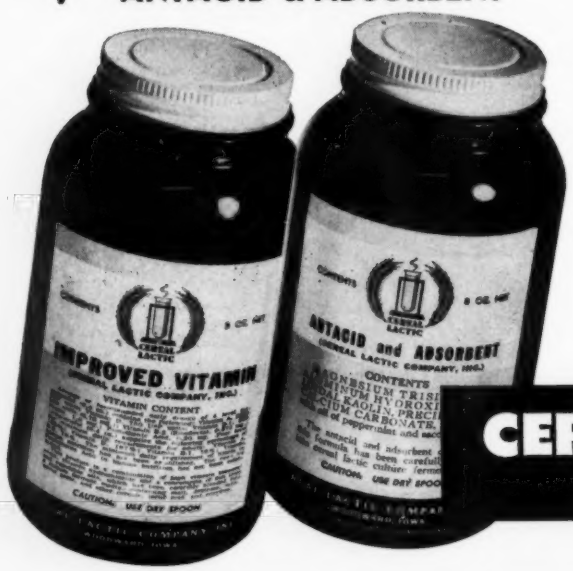
We add to the above (in balance):

Magnesium Triscilicate
Colloidal Kaolin
Calcium Carbonate
Aluminum Hydroxide

The development of the Cereal Lactic (Antacid and Adsorbent) balanced formula is recognized as an improved therapy in Gastric Hyperacidity and Peptic Ulcer cases.

CEREAL LACTIC
Now in TWO FORMS

*** IMPROVED VITAMIN *and* ANTACID & ADSORBENT**



Cereal Lactic (Improved Vitamin) formula—supplies lactic acid organisms, vitamins and EIGHT essential enzymes. This formula is indicated in GASTRO-INTESTINAL disorders when hyperacidity and flatulence ARE NOT symptoms.

Cereal Lactic (Antacid and Adsorbent) formula PLUS an effective antacid and adsorbent formula. This product is indicated in GASTRIC disorders when hyperacidity and flatulence ARE symptoms.

Both products are widely prescribed by the Profession as an effective treatment for Gastro-Intestinal disorders.

CEREAL LACTIC CO.
WOODWARD, IOWA

CYCOTIN

CURBS HUNGER AND APPETITE

Quickly, Safely, Effectively

With an estimated† 25,000,000 American adults overweight, the medical profession shoulders a heavy responsibility in advising those who seek their help as to how to eliminate the excess poundage. Since "the one consistent and demonstrable finding in obesity is overeating,"* an important key to successful management is obviously control of appetite. Cycotin exerts dual anoretic action. Note the:

HIGH methylcellulose content

(500 mg. per tablet)—quickly imparts a sense of fullness by providing non-nutritive intestinal bulk; also increases moisture of stool.

LOW d-amphetamine phosphate content

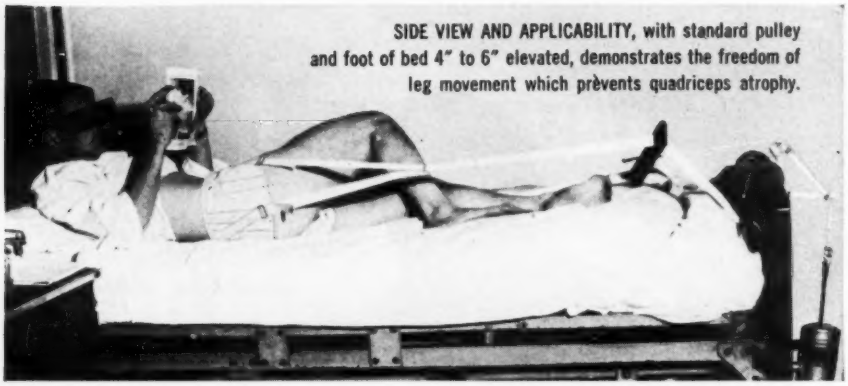
(1.67 mg. per tablet)—moderate dosage usually obviates or materially reduces undesirable side-effects.

DOSAGE: Initially, 3 tablets t.i.d. with a full glass of water ½ hour before meals—adjust to individual requirements for proper maintenance.

REED & CARNRICK

FOUNDED IN 1860 — JERSEY CITY 6, N. J. — TORONTO, ONT.

†Metropolitan Life Insurance Co.
*M. Clin. North Am. 35:483, 1951



SIDE VIEW AND APPLICABILITY, with standard pulley and foot of bed 4" to 6" elevated, demonstrates the freedom of leg movement which prevents quadriceps atrophy.

Long Awaited..... **CAMP-VARCO**

PELVIC TRACTION BELT

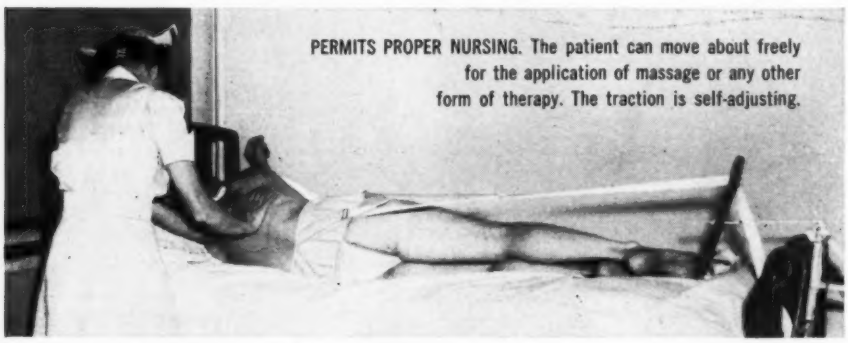
indicated in the treatment of

LOW BACK INJURIES

An effective and practical adjunct in the treatment of low back injuries, following the tested designs of Dr. Samuel Varco.

Clinicians regard it as a marked improvement over present traction methods. In no way does it restrict the use of any other modalities which may be desired.

Ease of application, cheerful acceptance by the patient, its availability for men, women and children at hospital or home and a decrease in the demands on the nursing staff make the Camp-Varco Pelvic Traction Belt a distinct contribution. Write for literature.



PERMITS PROPER NURSING. The patient can move about freely for the application of massage or any other form of therapy. The traction is self-adjusting.

S. H. CAMP AND COMPANY, JACKSON, MICHIGAN

Offices in New York • Chicago • Windsor, Ontario • London, England

"Nowhere in medicine are more dramatic therapeutic effects obtained than those which follow estrogen therapy in the girl who has failed to develop sexually. A daily dose of 2.5 to 3.75 mg. of 'Premarin' given in a cyclic fashion for several months may bring about striking adolescent changes in these individuals."*

* Hamblen, E. C.: Some Aspects of Sex Endocrinology in General Practice, North Carolina M. J. 7:533 (Oct.) 1946.

"PREMARIN" ®

Estrogenic Substances (water-soluble) also known as Conjugated Estrogens (equine).

"Premarin"—a naturally occurring conjugated estrogen—long a choice of physicians treating the climacteric—has been earning further clinical acclaim as replacement therapy in hypogenitalism.

In the treatment of hypogenitalism, the aim of "Premarin" therapy is to develop the reproductive and accessory sex organs to a state compatible with normal function.

Four potencies of "Premarin" permit flexibility of dosage: 2.5 mg., 1.25 mg., 0.625 mg., and 0.3 mg. tablets; also in liquid form, 0.625 mg. in each 4 cc. (1 teaspoonful).

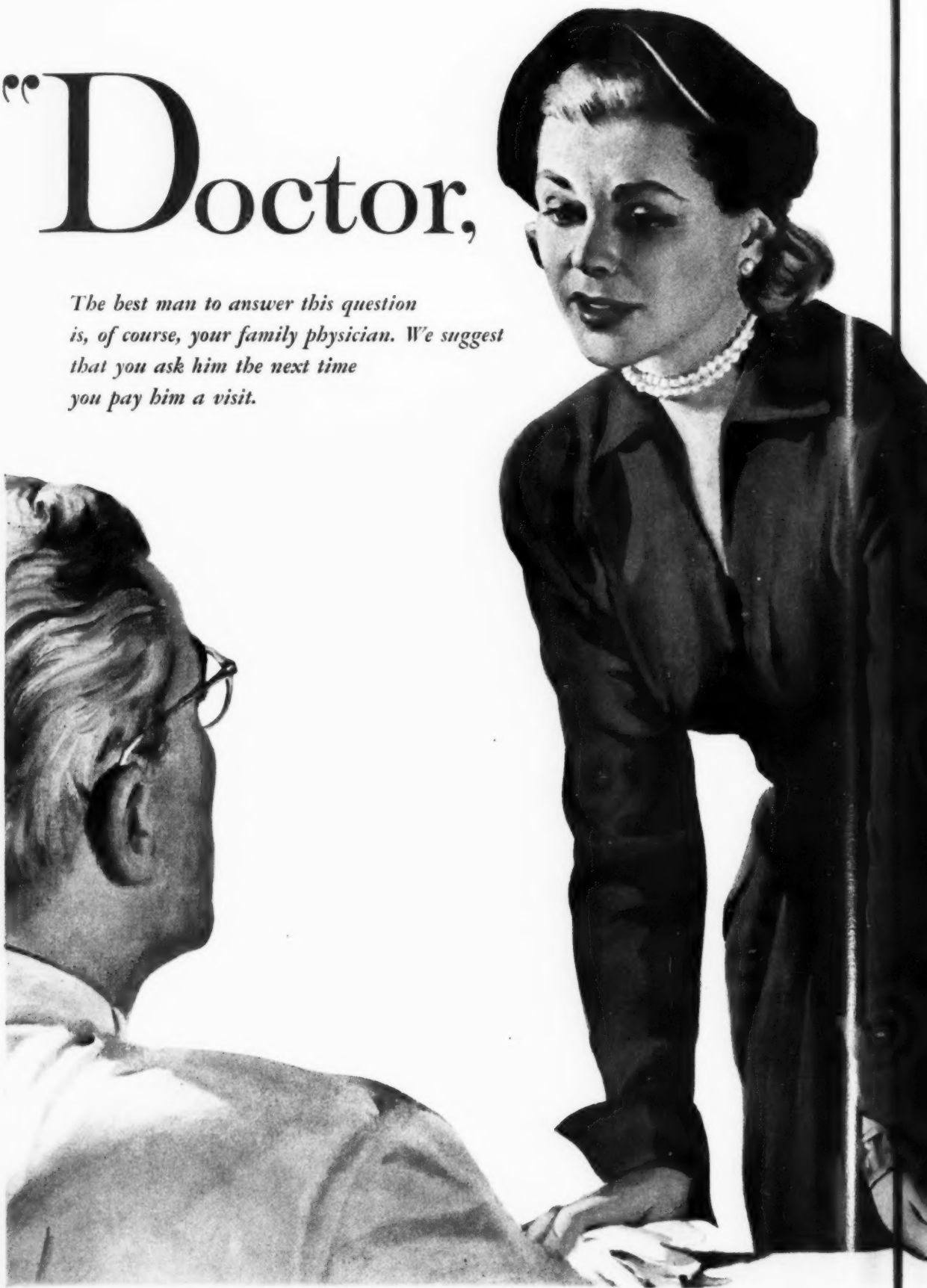
"Premarin" contains estrone sulfate plus the sulfates of equilin, equilenin, β-estradiol and β-dihydroequilenin. Other α- and β-estrogenic "diols" are also present in varying amounts as water-soluble conjugates.

Ayerst, McKenna & Harrison Limited
22 East 40th Street, New York 16, New York

5005 R

"Doctor,

The best man to answer this question is, of course, your family physician. We suggest that you ask him the next time you pay him a visit.



I'd like to know...

what is a NUTRITIONAL TIME BOMB?"

"Nutritional Time Bomb" is science's dramatic name for an equally dramatic discovery about diet...the discovery that injuries caused by mistakes in diet may not reveal themselves until years later.

Like actual time bombs, these injuries remain hidden and unrecognized, exploding into symptoms when it is too late to do anything about them. Thus, the dietary wrongs of childhood may be visited upon the adult.

Such scourges of later life as tooth decay, goiter, high blood pressure, heart disease, anemia and hardening of the arteries are not necessarily caused by present diet faults. They may be the delayed effects of earlier injury, where a dietary deficiency has existed too long.

A sound child body—the foundation of a sound adult body—must be built from the food that goes into it. The true effect of a mother's care during childhood has only begun to be understood. And, since eating habits are formed in childhood, the conscientious parent can do much to insure the child against later penalties of wrong eating.

The protective foods should be used generously in the daily diet. Important among these are bananas—long prescribed by doctors as one of the first solid foods for infants. Bananas have a well-rounded supply of vitamins and minerals, and are distinctly beneficent in their action upon the digestive tract. Because of the many appetizing ways in which bananas can be served, as well as because of their nutritional value, they are now being more widely used than ever.

FOR HEALTH, EAT AND ENJOY A PLENTIFUL VARIETY OF THE "RIGHT" FOODS

UNITED FRUIT COMPANY

announcing

. . . a bulk producer so finely processed that in solution with milk or water it easily passes through the openings of an ordinary nursing nipple.

Such ultra-fineness makes *L. A. Formula* especially attractive for use in ulcer or colitis patients. The gravida, the nursing mother, the aged and bedridden, children, your most fastidious patient—all find the improved *L. A. Formula* pleasant and easy to take.

NEW *l.a.formula*

Improved bland bulk producing laxative

compare these advantages

1. *L.A. Formula* dissolves in water almost instantly and so completely that there are no particles left in the mouth to irritate or annoy.

2. Taking *L.A. Formula* is like drinking a glass of pleasantly sweetened water. There is no sensation of drinking a jell. Highest patient acceptance is assured.

3. *L.A. Formula* is effective. Its softly compact, well-formed stool promotes physiological peristalsis, acts to reestablish the normal defecation reflex. Evacuation of the rectum is easy and complete and soiling is reduced to a minimum.

4. *L.A. Formula* does not interfere with absorption of fat-soluble vitamins A, D, E and K. Prothrombin levels are not affected and metabolism of calcium and phosphorus remain unimpaired.

5. *L.A. Formula* is not habit forming. It is non-irritating and does not leak or complicate the hygiene of the anorectal region.

6. *L.A. Formula* reduces anorectal complications. Thiele reports that in a large obstetric clinic where mineral oil is prescribed routinely, the incidence of anorectal infections is 5 per cent. In two private practices in which certain bulk producing hemicelluloses were given in place of mineral oil, the incidence of anorectal infections is only 1.7 per cent.[1]

7. Calories? Only 13 per dose (heaping teaspoonful).

We encourage you to write for samples for clinical comparison

Supplied: 7 and 14 oz. cans.

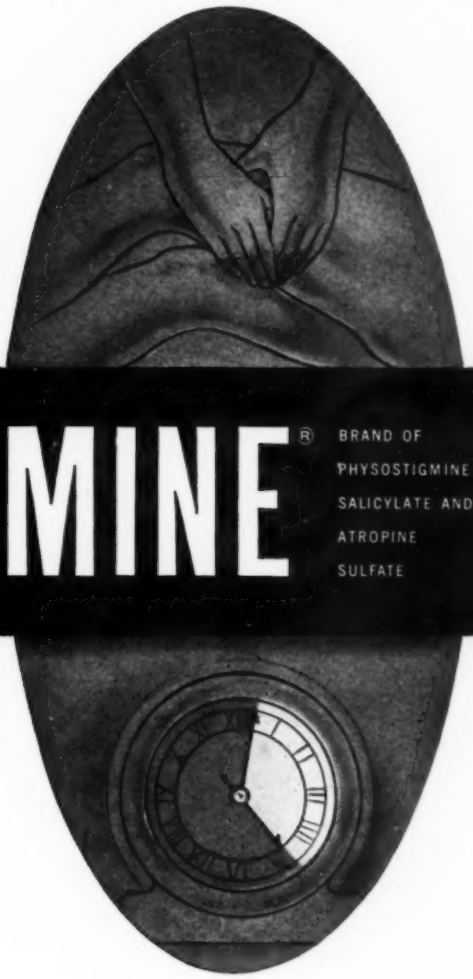
Formula: 50% Plantago ovata coating dispersed in lactose and dextrose.

Burton, Parsons & Company

Washington 9, D. C.

1. THIELE, G. H.: Southern Med. J. *35*:920 (Oct.) 1942.

preceding manipulation...



PHYATROMINE®

BRAND OF PHYSOSTIGMINE SALICYLATE AND ATROPINE SULFATE

...relieves skeletal muscle spasm

..."readies" the patient for effective physiotherapy in just 15 to 30 minutes

PHYATROMINE provides prompt and prolonged relief from painful muscle spasm due to injuries, lumbar or sacroiliac strain, pulled ligaments, bursitis, spondylitis, fibrositis, and rheumatoid arthritis. Thus, **PHYATROMINE** facilitates osteopathic manipulation and speeds up the return of normal muscle and joint function.

PHYATROMINE is relatively low in cost... ready to inject... easy to use... and its atropine sulfate content minimizes undesired side effects.

Each cc. of **PHYATROMINE** contains:
Physostigmine Salicylate.....0.6 mg.
Atropine Sulfate.....0.6 mg.
In isotonic solution of sodium chloride

Please send me:
.....Professional sample vial of 5 cc. without cost or obligation.
.....30-cc. multiple-dose vials of **PHYATROMINE** at $6.30 per vial.
.....1-cc. ampuls in boxes of 25 at $6.30 per box.
(Quantity prices on request)

☐ CHARGE C.O.D. ☐

NAME _____
(Please Print)

ADDRESS _____

CITY _____ ZONE ____ STATE _____

K·U

Kremers-Urban Company

Ethical Pharmaceuticals Since 1894

MILWAUKEE 1, WISCONSIN

relief

from the distress of hypertension

1
2
3
4
5

REFERENCES

Maison, G. L., and Stutzman, J. W.: A. Bioassay for Veratrum Derivatives Based on Hypotension in Dogs, Arch. internat. de pharmacodyn, et de thérap. *85*:357 (Feb. 1) 1951; Bioassay Method for Derivatives of Veratrum Viride, Federation Proc. *9*:299 (Mar.) 1950.

Wilkins, R. W.; Stanton, J. R., and Freis, E. D.: Essential Hypertension: Therapeutic Trial of Veriloid, a New Extract of Veratrum Viride, Proc. Soc. Exper. Biol. & Med. 72:302 (Nov.) 1949.

Kauntze, R., and Trounce, J.: The Hypotensive Action of Veriloid (Veratrum Viride); a Clinical Investigation, Lancet *1*:549 (Mar. 10) 1951.

Gropper, A. L.; Surtshin, A., and Hedrick, J. T.: Effects of Veriloid on Essential Hypertension: A New Derivative of Veratrum Viride, A.M.A. Arch. Int. Med. *87*:789 (June) 1951.

Freis, E. D.: Veratrum Viride and Hypertension, Correspondence, J.A.M.A. *144*:1023 (Nov. 18) 1950.

VERILOID*

A potent hypotensive principle biologically standardized in mammals[1]

Veriloid produces a prompt and sustained drop in blood pressure in all forms of hypertension by peripheral vasorelaxation. Its action brings quick relief from the distressing discomforts due to elevated blood pressure. Reduced incidence of hypertensive headache and improved renal function and visual acuity promptly follow its administration. These effects are often experienced by the patient even before the blood pressure has been dropped significantly. The objective and subjective benefits accruing from Veriloid therapy can be long maintained, since tolerance to Veriloid is not prone to develop.[2,3,4]

Because Veriloid represents the purified hypotensive fractions of Veratrum viride, free from the undesirable inert material common to the whole plant, it is well tolerated by most patients even in relatively large doses.[2,4,5] Veriloid is biologically standardized in mammals for pharmacologic uniformity and is administered by weight—in milligrams, eliminating the natural variables affecting the potency of the whole dried plant.

Dosage: The dosage of Veriloid varies with the individual, and even in the individual it may vary periodically. The usual daily requirement for Veriloid is 9 to 15 mg., given in divided dosage three times daily, every 6 to 8 hours, the first dose to be taken after breakfast. The evening dose should be 1 or 2 mg. larger than the other two doses of the day.

Veriloid is available in 1, 2 and 3 mg. scored tablets, in bottles of 100, 500 and 1,000.

VERILOID-VPM

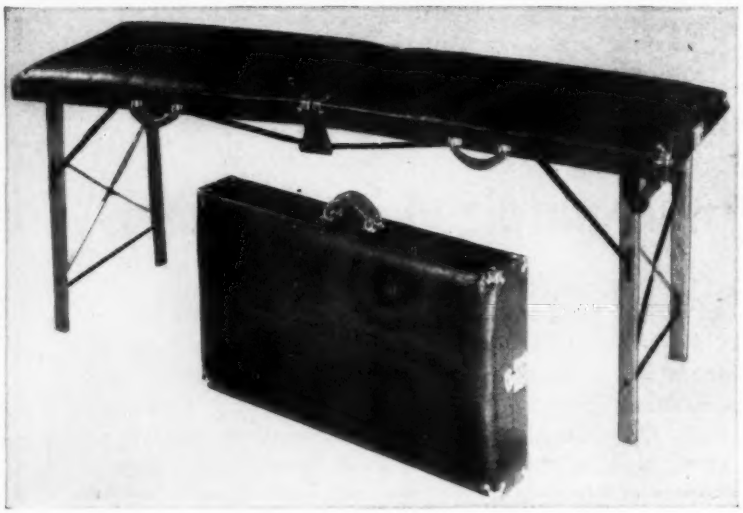
Containing Veriloid (2 mg.), phenobarbital (15 mg.), and mannitol hexanitrate (10 mg.), Veriloid-VPM provides valuable sedation and the vasodilating action of mannitol hexanitrate. This combination usually makes possible reduced dosage without sacrifice of therapeutic efficacy. Furthermore, phenobarbital adds the advantage of widening the spread between effective therapeutic dosage and the dosage at which side reactions occur.

VERILOID WITH PHENOBARBITAL

Veriloid With Phenobarbital (Veriloid, 2 mg., phenobarbital, 15 mg.) provides sedation without the action of mannitol hexanitrate. It is valuable when emotional tension must be controlled.

RIKER LABORATORIES, INC.
8480 BEVERLY BLVD. • LOS ANGELES 48, CALIF.

Treatment Tables and Stools Available



IDEAL FOLDING TABLE

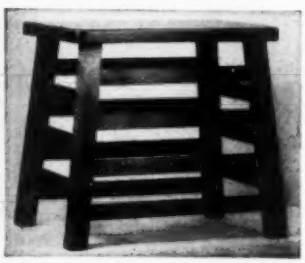
Well constructed, strong. Will not tip or shake.
Easy to open and close. Length 69". Width 22". Height 27½". Carrying weight 32 lbs.
Walnut finish.
Simulated leather covering — brown, green or maroon.
Heavy standard padding (Paratex and felt.) 2" Paratex padding $10.00 additional. Shipping weight 35 to 37 lbs.

Price—$40.00

IDEAL STRAIGHT TABLE

Handmade by expert craftsmen.
Handsome, Strong, Durable, Comfortable.
Solid wood legs 3"x4".
Length 72". Width 22".
With drawer $5.00 additional.
With stirrups $10.00 additional.
Height 27½". Shipping weight 125 to 130 lbs.
Artificial leather covering—brown, green or maroon. Heavy standard padding, (Paratex and felt.) 2" Paratex padding $10.00 additional.

Solid Fir Wood.....$45.00 Solid Oak.....$50.00
Solid Walnut.....$65.00



The manufacturers of these tables and stools give an unconditional guarantee on workmanship and materials. All items shipped f.o.b. from factory in Kirksville, Mo. Cash must accompany orders.

IDEAL STOOL

Sturdy and well-made. Will not tip over.
Solid wood construction. Three and four rungs. Top made of one piece solid wood 1½" thick.
Polished or upholstered top. Length 22". Width 14". Height 20". Shipping weight 25 lbs.
Medium oak .....$28.00 Walnut $35.00

DISTRIBUTORS

American Osteopathic Association

212 E. Ohio St., Chicago, Ill.

LACTOGEN®

A powdered all-milk formula closely approximating breast milk

ACCEPTED COUNCIL ON FOOD AND NUTRITION AMERICAN MEDICAL ASSOCIATION

Lactogen is a natural *all-milk* formula consisting of whole cow's milk modified with milk fat and milk sugar and fortified with iron. It contains no milk substitutes.

Closely approximating the composition of breast milk in other factors, Lactogen, however, provides a one-third more liberal allowance of protein.

Lactogen is prepared by simply stirring into warm, previously boiled water. It is made up with equal ease, either for a single feeding or for an entire day's use.

DEXTROGEN®

A convenient, economical, high quality liquid formula

ACCEPTED COUNCIL ON FOODS AND NUTRITION AMERICAN MEDICAL ASSOCIATION

All the mother need do is pour the contents of can into a properly cleaned quart milk bottle, and fill with previously boiled water. Makes 32 ounces of formula, ready to feed.

Dextrogen is a concentrated infant formula made from whole milk modified with dextrins, maltose, and dextrose. In ready-to-use liquid form, one needs only to—

Dilute...Then feed

In normal dilution, Dextrogen yields a formula containing proteins, fats, and a mixture of carbohydrates in quantities and proportions eminently suited for infant feeding. Its higher protein content provides a liberal allowance for every protein need of the infant. Its lower fat content makes for better tolerability and for improved digestibility.

THE NESTLÉ COMPANY, INC.
COLORADO SPRINGS, COLORADO

LAVORIS
MOUTHWASH AND GARGLE
REG. U.S. PAT. OFF.

Smoke a Lot?

ACTIVE INGREDIENTS
Zinc Chloride - Menthol
Formaldehyde - Saccharine
Oil Cinnamon - Oil Cloves
Alcohol 5%

Tangy
Cinnamon - Clove
Flavor

A Lavoris rinse will cleanse,
freshen and soothe
mouth and throat tissues

THE LAVORIS COMPANY • MINNEAPOLIS 1, MINN.

Left (in inset): Close-up view of automatic control panel.
Below: Entire remote control console for Mattern Royal 100 MA Unit.

the mattern

low priced
royal 100
MA unit
with rotating
anode tube

$3292
F.O.B. CHICAGO
(Rotating Anode
Tube at
additional cost)

better value dollar for dollar—
plus the features that spell x-ray efficiency . . .

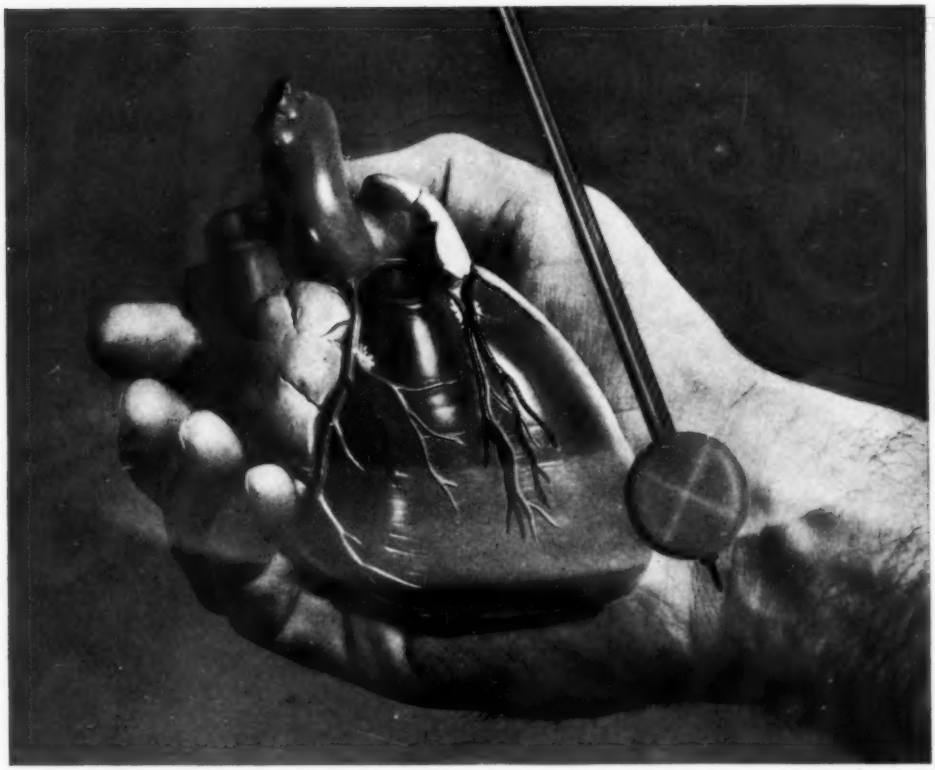
The Mattern Royal 100 offers an unusual dollar-for-dollar value which is particularly remarkable in the low-cost tilt table field. Among its special features are:

- Completely automatic control (see illustration above).
- Rotating anode tube—need not be removed when changing position of table. Counterbalanced 12" x 16" fluoroscopic screen and tube—travel in unison—raise, lower, or angle as desired.
- Hand tilt mechanism which permits use of table in either horizontal or vertical plane. Tube stand mounted separately on tracks, allowing greatest flexibility in positioning.
- Bucky diaphragm on full-length track beneath table. Bucky tray has self-centering and locking device . . . takes cassettes up to 17" x 17".
- Mattern design and engineering—resulting in simplicity of installation and long, trouble-free operation. Mattern equipment calls for the minimum in repair service.

F. MATTERN MFG. CO.

See your local Mattern dealer, or write direct to us for information.

4635-4659 NORTH CICERO AVENUE • CHICAGO 30, ILLINOIS



regulate cardiac output...more precisely

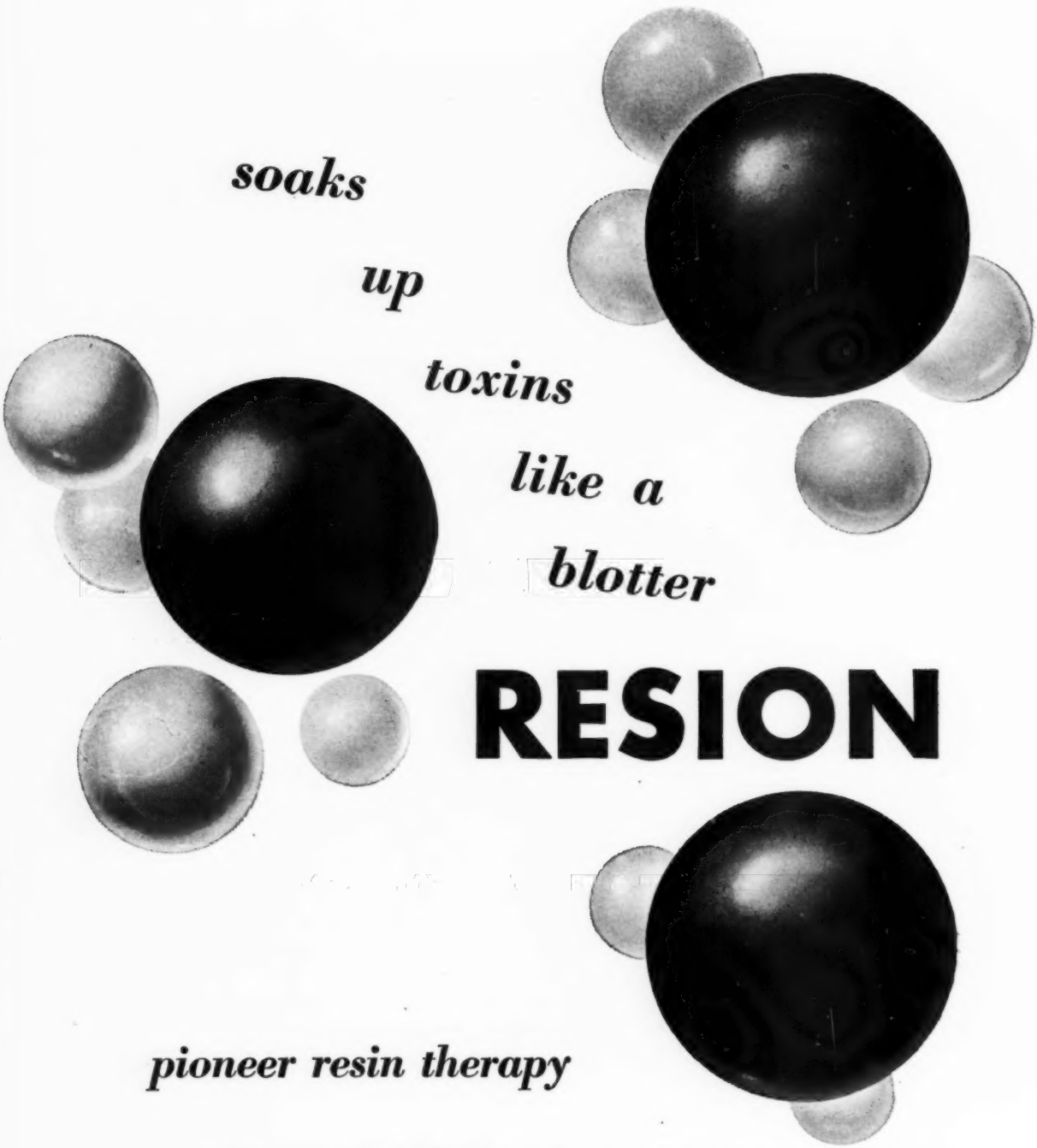
Digitaline Nativelle provides *positive maintenance*—positive because it is completely absorbed and uniformly dissipated. It affords full digitalis effect between doses. Since the non-absorbable glycosides, so frequently causing gastric distress, are eliminated, untoward side reactions are rare. Because of this efficiency Digitaline Nativelle is a cardiotonic of choice of leading cardiologists the world over. For the comfort and protection of your patients—for your own assurance—specify Digitaline Nativelle in full when you prescribe.

digitaline nativelle

Chief active principle of digitalis purpurea (digitoxin)
(not an adventitious mixture of glycosides)

For dosage instructions consult Physicians' Desk Reference

Send for brochure
"Modern Digitalis Therapy"
Varick Pharmacal Company, Inc.
(Division of E. Fougera & Co. Inc.)
75 Varick St., New York



RESINAT
RESION
NATRINIL

RESINAT—the ANION exchange resin. Inhibits pepsin. Normalizes hydrochloric acid. Adsorbs acid in the stomach, releases it harmlessly in the alkaline small intestine. Indicated in PEPTIC ULCER.

NATRINIL—the CATION exchange resin. For sodium withdrawal. Indicated in CONGESTIVE HEART FAILURE, EDEMATOUS STATES, HYPERTENSION.

In diarrhea, and the nausea of pregnancy —

RESION is indicated wherever diarrhea, food poisoning or a generalized state of gastrointestinal toxicity exists.[1, 2] It is a valuable adjuvant in the treatment of these disorders. It is also of definite benefit in gastroenteritis, flatulence,[1] mucous colitis, infantile diarrhea[2, 3] and in the management of the nausea and vomiting of pregnancy.[4]

RESION is an extremely palatable suspension of special insoluble adsorbent ingredients and is specifically designed to *take up and remove* from the intestinal tract, toxic compounds. The effect is one of selective adsorption and electrochemical attraction.

RESION adsorbs and inhibits the action of many of the products of putrefaction in the intestinal tract and removes substances of endogenous bacterial origin, as toxins.[1, 2, 5, 6]

RESION'S individual constituents exert a mutually additive action:—[6, 7]

Polyamine methylene resin adsorbs toxic bacterial metabolites, such as indole and skatole, and also guanidine, histamine and tyramine.

Sodium aluminum silicate adsorbs the toxic amines—tyramine, cadaverine, histamine; putrescine, guanidine, also indole and skatole. It inhibits the action of lysozyme.[7]

Magnesium aluminum silicate adsorbs lysozyme,[1, 5, 6, 7] cadaverine and other amines resulting from putrefactive processes.

How supplied: **RESION** is supplied in a palatable vehicle:
Bottles of 4 and 12 ounces.

RESION

1 Rollins, C. T., to be published.
2 Joslin, C. L.: Del. St. Med. J. **25**:35, 1950.
3 Quintos, F. N.: Philippine J. of Med. **26**:155, 1950.
4 Fitzpatrick, V. P.; Hunter, R. E., and Brambel, C. E.: Am. J. Diges. Dis. **18**:340, 1951.
5 Meyer, K.; Prudden, J. F.; Lehman, W. L. and Steinberg, A.: Am. J. Med. **5**:482, 1948.
6 Martin, G. J.: Am. J. Diges. Dis. **18**:16, 1951.
7 Moss, J. N. and Martin, G. J.: Am. J. Diges. Dis. **15**:412, 1948.

THE NATIONAL DRUG COMPANY • Philadelphia 44, Pa.

safe...dependable...effective

New Book

Goldberger—Heart Disease

Its Diagnosis and Treatment

By EMANUEL GOLDBERGER, B.S., M.D.

Associate Attending Physician, Montefiore Hospital, New York; Cardiologist and Attending Physician, Lincoln Hospital, New York; Lecturer in Medicine, Columbia University

In every respect, this is a clinical monograph written for general physicians who want an authoritative book that stresses *bedside diagnosis and treatment* of heart disease and related conditions. Dr. Goldberger never loses sight of the fact that in most cases of heart disease, a diagnosis can be made by such simple procedures as *inspection, palpation, percussion, auscultation, fluoroscopy* and *electrocardiography*. Simple bedside methods for the diagnosis of auricular fibrillation, a-v block, nodal rhythm and paroxysmal tachycardia are presented.

Full coverage is given to normal and abnormal electrocardiographic patterns, fluoroscopic and *x*-ray findings, and to the latest advances in the use of electrokymograms, ballistocardiograms, angiocardiography, and catheterization of the heart. *Cardiovascular findings in infants and children are detailed* and specific dose schedules are given. Methods of diagnosis and indications for operation of congenital heart disease are included. The discussions of *treatment* are complete. Dr. Goldberger includes anticoagulant therapy, A C T H and cortisone, as well as other proved and accepted therapeutic procedures.

New Book. 651 Pages. 229 Illustrations on 90 Figures. $10.00

Washington Square **LEA & FEBIGER** Philadelphia 6, Pa.

For **DUODENAL-GASTRIC ULCER**

One in Ten Have—
Have Had or Will Have Peptic Ulcers

UNEXCELLED FOR GASTRIC HYPERACIDITY

FOR QUICK, LONGER LASTING RELIEF

Nothing takes the place of **CA-MA-SIL**

DOES NOT INDUCE ANOREXIA — CONTAINS NO SODA — NO ALUMINUM HYDROXIDE

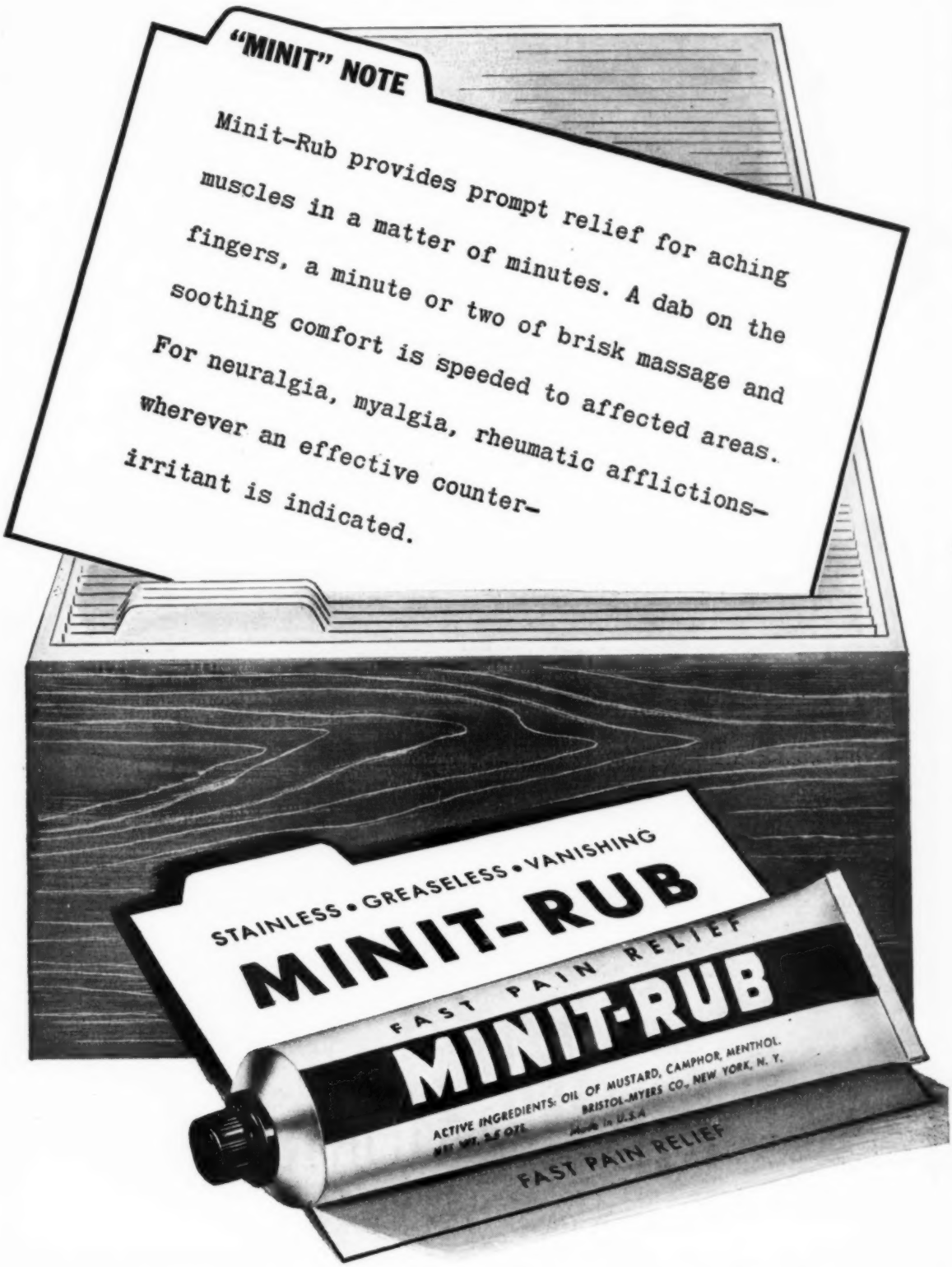
PRESCRIBED BY PHYSICIANS EVERYWHERE

NOT EXPENSIVE

Start the Patient on 2 Level Teaspoonfuls in ½ Glass of Water, Preferably Warm or Hot, Both Before and After Each Meal and at Bed-Time—Also Between Meals if Necessary.

ALSO EXCELLENT FOR NAUSEA OF PREGNANCY

CA-MA-SIL CO. · 700 Cathedral Street · Baltimore 1, Md.


"MINIT" NOTE
Minit-Rub provides prompt relief for aching muscles in a matter of minutes. A dab on the fingers, a minute or two of brisk massage and soothing comfort is speeded to affected areas. For neuralgia, myalgia, rheumatic afflictions— wherever an effective counter-irritant is indicated.
STAINLESS • GREASELESS • VANISHING
MINIT-RUB
FAST PAIN RELIEF
MINIT-RUB
ACTIVE INGREDIENTS: OIL OF MUSTARD, CAMPHOR, MENTHOL.
BRISTOL-MYERS CO., NEW YORK, N. Y.
FAST PAIN RELIEF

PRODUCT OF BRISTOL-MYERS • 19 WEST 50 STREET • NEW YORK 20, N. Y.

YOU, Doctor, are the best judge, so

BELIEVE IN YOURSELF!

With so many claims made in cigarette advertising, most doctors prefer to judge for themselves. So, Doctor, won't you make this simple test?

Take a PHILIP MORRIS—and *any* other cigarette. Then,

1. Light up either one. Take a puff—don't inhale—and s-l-o-w-l-y let the smoke come through your nose.

2. Now do exactly the same thing with the other cigarette.

Notice that PHILIP MORRIS is definitely less irritating, definitely milder.

Then, Doctor.....BELIEVE IN YOURSELF!

PHILIP MORRIS

Philip Morris & Co. Ltd., Inc.
100 Park Avenue, New York 17, N. Y.

A Multiple Approach IN PEPTIC ULCER

The numerous factors involved in peptic ulcer, and the multiple approach needed to cope with these influences, are reflected in the sound formula of Alsical. This unusually effective preparation provides not only desirable antacid properties, but also an anticholinergic effect and sedation.

Prolonged Acid Neutralization Gastric hydrochloric acid is quickly dissipated by the neutralizing action of the four nonsystemic antacids. Relief from the characteristic distress is prompt, prolonged, and complete; there is no danger of alkalosis. Neither constipation nor diarrhea complicates the action of Alsical.

Vagal Inhibition Through partial vagal inhibition brought about by an anticholinergic action, the motor and secretory activity of the stomach is significantly decreased, encouraging reduction of pain and accelerated healing.

Sedation Adequate amounts of phenobarbital in the daily dose of Alsical allay emotional tension and apprehension, so frequently contributory factors in the origin and perpetuation of peptic ulcer.

Alsical is available as a powder in four-ounce cans and as tablets in bottles of 100.

SMITH-DORSEY, Lincoln, Nebraska
A Division of THE WANDER COMPANY

Each 60 grains of Alsical, equivalent to one teaspoonful, contains:

Phenobarbital	¼ gr.
Extract Belladonna	¼ gr.
Calcium Carbonate	24 gr.
Magnesium Oxide	10 gr.
Magnesium Trisilicate	15 gr.
Aluminum Hydroxide	10 gr.

Each Alsical tablet contains one-fourth the above quantities. Average dose, one teaspoonful or four tablets after each meal and upon retiring.

Alsical

A *Dorsey* PREPARATION

Stretching their dollars is your job, too!

In these days of high living costs, most young parents find that the expense of raising a baby is a more serious problem than ever. That's why they are so grateful for advice that enables them to give their baby the best food and care at the lowest cost. As a physician, you want to help young parents with this problem. And you can do this so easily with Pet Evaporated Milk, which can save parents from $10 to $50 or more in the first year on the baby's food alone.

You can be confident, too, that there is no better form of milk than Pet Milk — sterilized in the sealed can — its protein heat-softened to practically the same ready digestibility of human milk — complete in all the essential food values of whole milk — recommended for bottle-fed babies by so many physicians everywhere in the United States.

FAVORED FORM OF MILK FOR INFANT FORMULA

PET MILK COMPANY, 1464-G Arcade Building, St.Louis 1, Missouri

RIASOL in PSORIASIS

AFTER USING RIASOL

Dermatologists have observed that lack of sunlight aggravates the lesions of psoriasis. This may account for patches appearing on the parts which are covered with clothing and hair.

Short, dark days and heavy winter clothes keep out the beneficial sunlight. Psoriasis is likely to get worse at this season. Prompt treatment with RIASOL may be counted on to help clear these unsightly lesions.

Apply daily after a mild soap bath and thorough drying. A thin, invisible, economical film suffices. No bandages necessary. After one week, adjust to patient's progress.

BEFORE USING RIASOL

THOUSANDS PRESCRIBE RIASOL

RIASOL CONTAINS 0.45% MERCURY CHEMICALLY COMBINED WITH SOAPS, 0.5% PHENOL AND 0.75% CRESOL IN A WASHABLE, NON-STAINING, ODORLESS VEHICLE

SEND FOR A CLINICAL PACKAGE

PROVE RIASOL YOURSELF

SHIELD LABORATORIES

DEADLINE ONLY 5 MONTHS AWAY

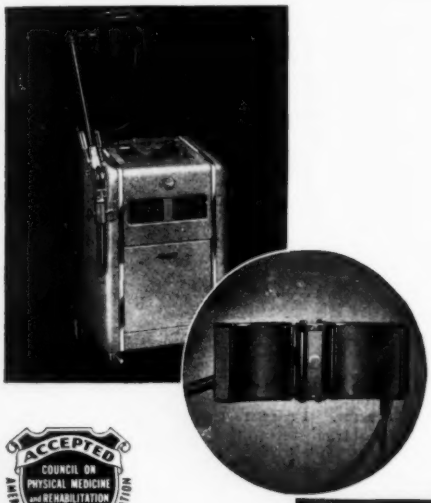
After June 30, 1952

ALL MEDICAL DIATHERMY MACHINES

in order to be Lawfully Used
must conform to the requirements of
The Federal Communications Commission

If the Diathermy Unit you are now using does not bear an F.C.C. Type Approval Number, Immediate Action is Recommended by the Journal of the American Medical Association, June 2, 1951, issue, Page 481.

Let us send you complete information on the FISCHER DE LUXE MODEL "400" SHORT WAVE DIATHERMY UNIT.



ACCEPTED COUNCIL ON PHYSICAL MEDICINE and REHABILITATION AMERICAN MEDICAL ASSOCIATION

- F.C.C. TYPE APPROVAL D-500
- UNDERWRITERS' LABORATORIES APPROVAL
- CANADIAN TYPE APPROVAL No. 7

FISCHER DE LUXE MODEL "400" can be used with all accepted applications, including the Patented Adjustable Induction Electrode or inductance cable.

Patented adjustable Induction Electrode, designed especially to fit any part of the body, gives even distribution of heat over entire treatment area.

FISCHER DE LUXE MODEL "400" is the highly efficient, practically trouble-free, self-excited oscillator type —no crystal control or master oscillator.

A Digest of the New F.C.C. Ruling on the use of Diathermy Equipment will be sent free and without obligation. Just fill in the coupon below and mail it to us.

H. G. FISCHER & CO., 9451-91 W. Belmont Ave., Franklin Park, Ill.
Please send, without obligation, full information on:.....

- ☐ FREE Copy of F.C.C. Digest of Rules and Regulation on Use of Diathermy Equipment.
- ☐ FISCHER De Luxe Model "400" Short Wave Diathermy Unit.
- ☐ Complete FISCHER line of X-Ray and Physical Therapy Equipment.
- ☐ Small Down Payment—Low Monthly Payments— INCOME - AS - YOU - PAY Plan.
- ☐ FREE Scaled Floor Plan showing above Units in My Office.

Name..... AOA

Address..... City..... Zone..... State.....

Doctor . . .

Here are two great Spot Tests that simplify urinalysis

GALATEST

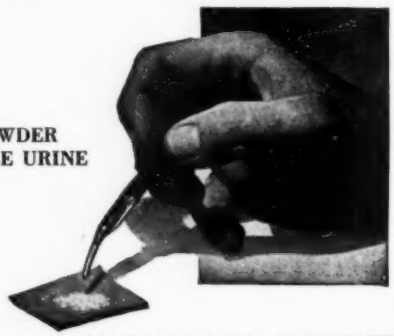
The simplest, fastest urine sugar test known.

ACETONE TEST

(DENCO)

For the rapid detection of Acetone in urine or in blood plasma.

A LITTLE POWDER
A LITTLE URINE



COLOR REACTION IMMEDIATELY

Galatest and Acetone Test (Denco) ... Spot Tests that require no special laboratory equipment, liquid reagents, or external sources of heat.

One or two drops of the specimen to be tested are dropped upon a little of the powder and a color reaction occurs immediately if acetone or reducing sugar is present. False positive reactions do not occur. Because of the simple technique required, error resulting from faulty procedure is eliminated. Both tests are ideally suited for office use, laboratory, bedside, and "mass-testing." Millions of individual tests for urine sugar were carried out in Armed Forces induction and separation centers, and in Diabetes Detection Drives.

The speed, accuracy and economy of Galatest and Acetone Test (Denco) have been well established. Diabetics are easily taught the simple technique. Acetone Test (Denco) may also be used for the detection of blood plasma acetone.

BIBLIOGRAPHY

Joslin, E. P., et. al: Treatment of Diabetes Mellitus —8 Ed., Phila., Lea & Febiger, 1946—P.241, 247.

Lowsley, O. S. & Kirwin, T. J.: Clinical Urology —Vol. 1, 2 Ed., Balt., Williams & Wilkins, 1944 —P. 31.

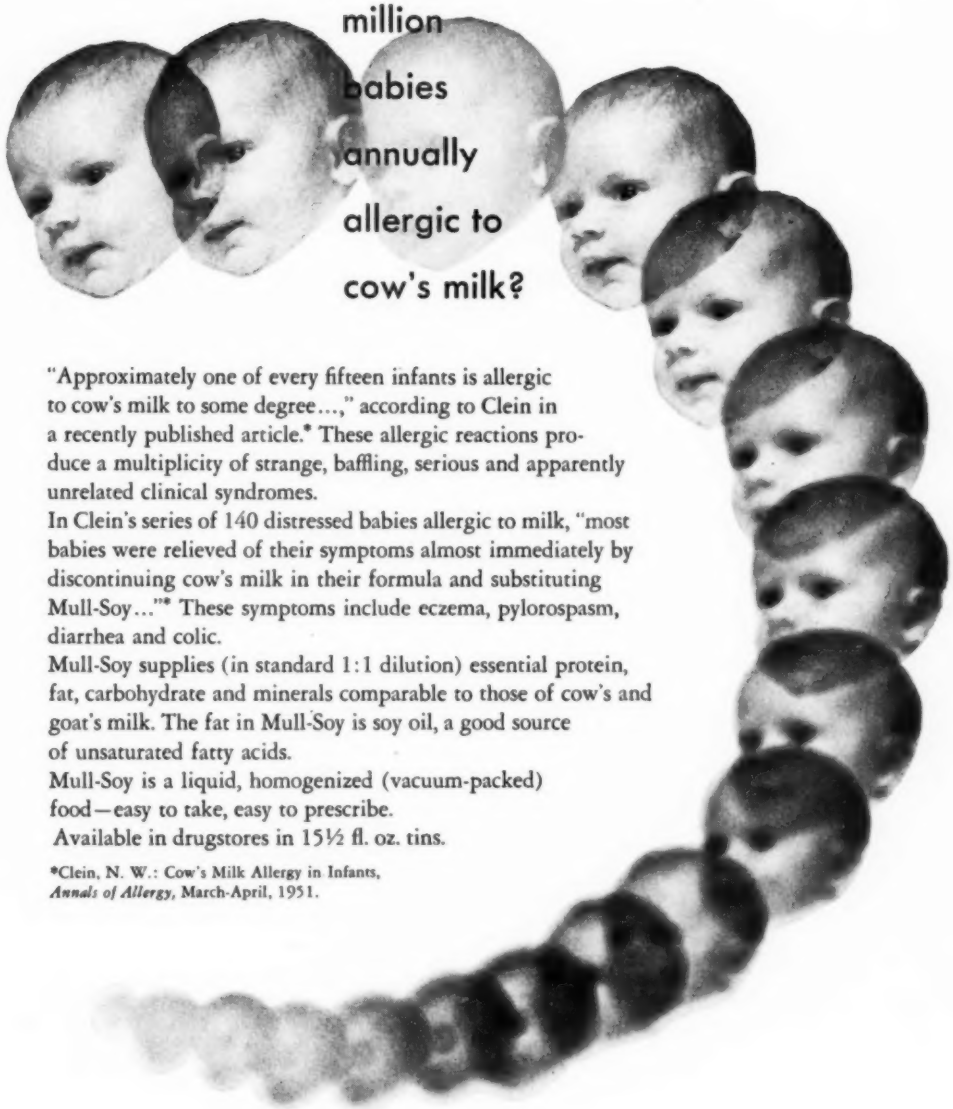
Duncan, G. G.: Diseases of Metabolism—2 Ed., Phila., W. B. Saunders Co., 1947—P. 735, 736, 737.

Stanley, Phyllis: The American Journal of Medical Technology—Vol. 6, No. 6, Nov., 1940 and Vol. 9, No. 1, Jan., 1943.

Write for descriptive literature

THE DENVER CHEMICAL MANUFACTURING CO., INC.
Dept. 12-S, 163 Varick Street, New York 13, N. Y.

almost
a quarter
million
babies
annually
allergic to
cow's milk?



"Approximately one of every fifteen infants is allergic to cow's milk to some degree...," according to Clein in a recently published article.* These allergic reactions produce a multiplicity of strange, baffling, serious and apparently unrelated clinical syndromes.

In Clein's series of 140 distressed babies allergic to milk, "most babies were relieved of their symptoms almost immediately by discontinuing cow's milk in their formula and substituting Mull-Soy..."* These symptoms include eczema, pylorospasm, diarrhea and colic.

Mull-Soy supplies (in standard 1:1 dilution) essential protein, fat, carbohydrate and minerals comparable to those of cow's and goat's milk. The fat in Mull-Soy is soy oil, a good source of unsaturated fatty acids.

Mull-Soy is a liquid, homogenized (vacuum-packed) food—easy to take, easy to prescribe.

Available in drugstores in 15½ fl. oz. tins.

*Clein, N. W.: Cow's Milk Allergy in Infants, *Annals of Allergy*, March-April, 1951.

Mull-Soy first in
hypoallergenic diets for infants, children and adults

The Borden Company, Prescription Products Division, 350 Madison Avenue, New York 17

FILM LIBRARY OF THE AMERICAN OSTEOPATHIC ASSOCIATION

Sponsored by Committee on Professional Visual Education
Martin E. Beilke, Chairman; John W. Mulford, O. A. Meyn

All bookings must be made through the office of the American Osteppathic Association, 212 E. Ohio St., Chicago 11, Ill. Films must be reserved several weeks in advance to avoid conflicting dates and delays in transportation. Catalog will be sent free upon request to members of the profession contemplating the use of the films. All films are 16 mm. silent unless otherwise specified.

FILM NO.	TITLE	PRODUCED BY	AUDIENCE SUITABILITY	NO. OF REELS	TIME TO SHOW	SERVICE FEE
1	Osteopathic Research — The Atlas Lesion	Drs. Rice, Burns, & Hoffman	Professional	3	50 min.	$3.50
7	Osteopathic Research — Second Lumbar Lesion	Drs. Rice and Burns	Professional	3	45 min.	$3.50
13	Osteopathic Research—Heart Disease—Effects of Selected Spinal Lesions upon Function and Structure of the Heart. SOUND and COLOR.	Dr. Ralph Rice and Dr. Louisa Burns	Either	1	30 min.	$3.50
2	Osteopathic Mechanics of the Dorsal Area	Dr. Ralph Rice	Professional	2	30 min.	$3.50
3	Osteopathic Mechanics of the Pelvis	Dr. Ralph Rice	Professional	3	45 min.	$3.50
4	Osteopathic Mechanics — Anterior Occiput	Drs. Wilson, Rice and Muir	Professional	1	15 min.	$2.50
6	Osteopathic Mechanics — Fourth on Fifth Lumbar Lesion—A Symposium	Dr. Rice	Professional	1	15 min.	$2.50
19	Osteopathic Mechanics — The First Thoracic Symposium	Dr. Rice	Professional	1	20 min.	$2.50
22	Osteopathic Mechanics — Left Lateroflexion Lesion of the Fifth on the Sixth Cervical Vertebra	Dr. Ralph Rice	Professional	2	30 min.	$3.50
21	Osteopathic Mechanics — Right Lateroflexion Lesion of the Fourth on the Fifth Lumbar Vertebra	Dr. Ralph Rice	Professional	3	45 min.	$3.50
23	Osteopathic Mechanics — Left Anterior Sacral Lesion	Dr. Ralph Rice	Professional	3	45 min.	$3.50
5	Osteopathic Therapeutics—Psoitis	Drs. Rice and Fryette	Professional	2	30 min.	$3.50
8	Osteopathic Therapeutics — Anterior Poliomyelitis	Drs. Rice and Pritchard	Professional	3	45 min.	$3.50
20	Osteopathic Therapeutics — The Treatment of Laryngitis	Drs. Riley and Rice	Professional	2	30 min.	$3.50
12-12-A	Athletic Injuries—The Charley Horse and the Sprained Ankle. Professional and Lay Edition. (Specify which)	Drs. Ralph Rice and Wilbur Bohm	Professional	2	30 min.	$3.50
10	Our American Feet, mechanics of feet, Technic of fitting shoes	Dr. Q. L. Drennan	Professional	2	30 min.	$3.50
11	The Anatomy and Mechanics of the Foot and Leg	Dr. H. E. Clybourne	Professional	1	15 min.	$2.50
9	Anatomy and Physiology of the Feet	Dr. H. E. Clybourne	Professional	1	15 min.	$2.50
17	Foot and Ankle Technic	Dr. H. E. Clybourne	Professional	1	15 min.	$2.50
18	Foot and Fibula Technic	Drs. Clybourne & Stinson	Professional	1	15 min.	$2.50
15	Hypertrophy of the Prostate	Eastman Kodak	Professional	1	15 min.	$2.50
14	Standard Obstetrical Routine	The Mennen Co.	Professional	6	80 min.	$3.50
16	Posture	Eastman Kodak	Either	1	15 min.	$2.50

Where Health is Concerned there can be no Compromise with Quality

The New Year's Gift

Christmas is over but throughout the new year you, Doctor, will continue your role as guardian of that gift of gifts—priceless good health.

We are proud if we may feel that Vitaminerals have played a small part in aiding you to carry on your important work.

We wish you and yours a Happy New Year!

VITAMINERALS INC.

GLENDALE 1, CALIFORNIA

which child was given immune serum globulin to modify measles?

The use of Immune Serum Globulin—Cutter to modify measles minimizes the occurrence of such complications as otitis media, bronchopneumonia, mastoiditis, meningitis, encephalitis, etc. And there is ample clinical evidence that a sound, natural immunity follows modified measles.*

Immune Serum Globulin—Cutter is concentrated gamma globulin obtained from freshly pooled adult *venous* blood. Each 2 cc. vial contains the antibody equivalent of 40 cc. of normal serum, permitting adjustable low dosage. With this crystal-clear, hemolysis-free Globulin, undesirable reactions are not likely to occur.

Write for comprehensive wall chart showing course of typical measles.

CUTTER LABORATORIES · Berkeley, California

For measles modification and prevention . . . specify

CUTTER / Immune Serum Globulin

Fractionated Entirely from Human Venous Blood

**References:*

1. Stokes, J., Maris, E. P., and Gellis, S. S., The Use of Concentrated Normal Human Serum Globulin (Human Immune Serum Globulin) in the Prophylaxis and Treatment of Measles. J. Clin. Invest. 23:531-540, 1944.

2. Karelitz, S., Does Modified Measles Result in Lasting Immunity? Jour. Pediat., 36:697, June 1950.

3. Stokes, J., Use of Gamma Globulin from Large Pools of Adult Blood Plasma in Certain Infectious Diseases. Ann. Int. Med., 26:353, 1947.

The Journal of the American Osteopathic Association

PUBLISHED MONTHLY BY THE AMERICAN OSTEOPATHIC ASSOCIATION

Vol. 51, No. 5 | 212 East Ohio St., Chicago 11, Ill. | January, 1952

COPYRIGHT, 1952, BY AMERICAN OSTEOPATHIC ASSOCIATION

Osteopathy and the Treatment of Acute Diseases*

A. REID JOHNSTON, D.O.

Hamilton, Ontario, Canada

Over the years the osteopathic profession has obtained remarkable results in the treatment of most diseases by following the simple principles set forth by Still. The importance of these principles can hardly be denied and, fortunately, Dr. Still also presented a means of implementing these principles. Eggleston[1] has mentioned the possibility of a single disease process. I do not recall that Dr. Still ever said that in so many words but I think that the concept of a single disease process is not out of keeping with his philosophy. It is my belief that the characteristics of diseases which tend to contradict the theory of a single disease process can be explained chiefly on the basis of variations of the individual. These variations may be due to hereditary factors and the effects of previous reactions of the body to environment; they may be due to the extent and location of injury and reaction; and they may be due to specific action of the injurious agent. I wish to emphasize this premise here.

The brevity of this presentation permits only conclusions and not a complete discussion. I shall begin with what I think is a basic definition which may seem more theoretical than practical.

Disease in its simplest form can be regarded as the injurious effect of environment on the body plus the physiologic reaction of the body to the injury; the result of these activities is some degree of permanent alteration of function potential. Perhaps the discussion will be clarified by a breakdown of this definition.

Environment can be considered to be all the things in which an individual participates by reason of the activity of any or all of his sensory abilities. Examples of environment are bacteria, physical contacts, climate, chemical contacts, and psychic factors.

Physiologic reaction involves communication. Means of communication are many and include the arterial, venous, lymphatic, hormonal, and nervous systems, and the cerebrospinal fluid; communication also takes place through continuity and contiguity. Although some of these may appear to be unimportant at times, none can be ignored in all instances.

Tissue alteration and body reaction combined involve a number of mechanisms which cause, among other effects, inflammation which I believe to be a consistent effect.

Permanent alteration of function potential is a feature which requires some extra attention. It is difficult to imagine that minute injury produces any permanent effect, yet one must admit that this does occur at some point on the scale of increasing insult and increasing sensitivity. The fact that there are at present no means of technically demonstrating the degree of tissue alteration producing a permanent effect is no reason to assume that permanent damage is limited to obvious gross changes. Indeed there is more and more evidence being produced to show that the body's ability to remember is much greater than was formerly recognized.

It is possible that permanent effects are left in all of the above named communicating tissues and fluids as well as in other tissues with which they communicate. Just as dripping water gradually wears away a stone so do the as yet undetectable permanent effects eventually produce detectable effects. A brief review of a few detectable effects of gross injury will give a lead as to what occurs minutely. Among other features attention is drawn by Burns[2] to skeletal alteration, by Denslow[3] to nervous facilitation, by Sutherland[4] to alteration of cerebrospinal fluid fluctuation, by Still[5] to muscular and connective tissue alteration, and by Selye[6] and others to changes in the hormonal and nervous systems and viscera chiefly under control of the pituitary and the hypothalamus. I do not mean to imply that these changes represent the entire philosophies of the persons named. They do indicate, however, phases of the subject for which these individuals have become noted through their investigations.

Function potential is altered with every passing hour, day, week, and month although one usually thinks of such changes in terms of decades. Selye maintains that for every adaptation acquired there is a coincident loss of adaptation ability for other circumstances (he refers to gross circumstances without necessarily implying the minor ones). As a result of Selye's[6] work, improved understanding of the widespread physiologic activity of the body in respect to changing environment should occur among physicians and researchers generally. Certainly the development of my presentation

*Presented at the meeting of the Academy of Applied Osteopathy, Milwaukee, July 21, 1951.

will be enhanced in giving a brief description of his findings.

Selye describes the general adaptation syndrome as an integrated syndrome of closely related adaptive reactions to nonspecific stress. He includes states of shock, countershock, resistance, and exhaustion in that order. Among other features, shock involves depression of the nervous system, hypotension, and acidosis. It is succeeded by countershock which involves chiefly reversal of the processes of the shock phase and increased nervous and adrenal activities under control of the hypothalamus and pituitary glands. Resistance follows with adaptation to one agent at the expense of resistance to other agents. As a result some changes from normal persist including hypertrophy of cortical cells, increased cholesterol of the adrenals, and a degree of sympatheticotonia. Exhaustion occurs when adaptability can no longer be maintained. Selye's work is extensive and covers changes in all of the systems of the body. His approach to treatment may be said to revolve chiefly about the endocrine system.

The osteopathic approach is as perfect as the individual physician's understanding and ability. As osteopathic physicians we are confronted with individual patients, each displaying his own peculiarities—including the total effect of past environment—which are expressed in the conditions of his somatic tissues, joint activities and positions, nervous manifestations, cerebrospinal fluid activity, and even his palpable abdominal and other viscera. The somatic effects can be seen in single joints, groups of joints, spinal patterns, and cranial patterns with their supportive tissues. Their state varies from extreme acuteness to extreme chronicity and, most important, they reflect accurately the conditions existing in all parts of the body. Now I would not imply that one can invariably diagnose conditions from these findings in the same sense that one might diagnose diabetes from a sugar tolerance test. But with analysis of one portion of body function, the somatic portion, sufficient information can be gained to enable the osteopathic physician to influence disease processes with a degree of selectivity and exactness unimagined by other fields of the healing art. Still remarked that the osteopathic physician has his own symptomatology.[7]

The achievement of this selectivity and exactness of dosage requires a fundamental theory from which to work and an understanding of the development of disease from its inception. The fundamental process or disease, somewhat along the line of that originally described, repeated over and over in thousands of different ways and in varying intensities and locations brings the individual to the condition in which he is seen as a patient. Northup[8] has aptly described this as the "mosaic of disease."

In osteopathic literature are found references to what is generally termed a structural pattern in an individual. I am sure that every osteopathic physician is aware of this entity. Pearson[9] has reported x-ray findings of well-established structural patterns in school children as early as the sixth or seventh year. My present opinion is that more or less basic structural patterns are established shortly after birth and in some instances previous to birth as a result of prenatal stresses producing cranial and other osteopathic changes. It is important to remember that with these injuries reactions took place which involved every tissue in the body. To regard these changes solely as structural would be a fundamental error. Apparently it is this basic pattern of structure and physiology which largely dictates the courses of subsequent reactions during the life of the individual.

In viewing the mechanical evolution of the structural pattern, one sees an alteration from normal in the distribution of work in the body dependent upon the development of fibrotic areas as a result of the original injury and subsequent compensation. Motion is shifted toward the nonfibrotic areas of free movement and these become areas of overwork, muscular hypertrophy, and inflammation with accompanying facilitation. The localization of these areas of increased movement may be said to occur roughly on the convexities of scoliotic curves, on the aspect of exaggerated movement of flexion and extension curves, and at single joints involved in sharp change from the general pattern. These are the areas in which the greatest effect of and reaction to environment take place. Eventually these areas in turn accommodate by fibrosis with lesser degree of facilitation. Related to facilitated areas are the regions of visceral hyperactivity and inflammation. For the most part these are the areas of major concern in acute disease.

The acute phase of acute disease is initiated by a degree of general suppression of body function of varying duration and severity. It may be momentary shock passing unnoticed or it may be of such severity that it will render the victim unconscious. In some of the more severe injuries it should be ascertained whether the patient is still in the initial phase; for the most part, however, patients have passed through it and are in the phase of reaction.

With regard to the general aspect of the acute phase, I feel that there is a process leading up to the onset of acute disease which involves in part a gradually increasing nervous activity of the higher and lower centers as a result of mild clashes with environment with which the patient is able to cope without producing symptomatic illness. With the possible exception of very potent environmental factors such as accidents and the like, the acute condition of the patient is, I believe, the effect of a precipitating factor plus the evident reaction to this factor acting in an individual who has previously undergone some degree of hyperactivity of the nervous system. When this hyperactivity occurs there is a corresponding decrease in the facility of efficient physiologic response to many environmental factors. If allowed to continue after the inception of acute illness this state of nervous hyperactivity constitutes an obstacle to recovery. Accompanying and exaggerating this state is the effect of the patient's own concern regarding his health. This state of increased nervous tension from whatever cause has, if recognized at all, been much underrated in the past. I wish to emphasize its importance here. Since nervous tension is a result of clashes with environment pains must be taken to avoid such encounters.

Before going further I wish to clarify this point of nervous hyperactivity. It should be understood that there is no such thing as nervous hyperactivity alone. It is inconceivable that it could occur without altered activity of the entire body. It might be more clear if I refer to the condition as a general body change one aspect of which is general nervous hyperactivity. I emphasize the nervous portion because I feel that the effects of osteopathic manipulative therapy are mediated in part through nervous elements. I also

emphasize it because of the selectivity which is characteristic of the nervous system's activity as compared with other body activities and in view of the physician's ability to administer treatment in accord with tissue activity and its response. One feature of this activity is decreased muscular coordination with increased susceptibility to mechanical types of injury. Furthermore, general nervous hyperactivity implies, among other things, increased total sensory perception and exaggerated response. When the body is confronted with a shock-producing stress—be it great or small—abnormal perception and abnormal response combine to produce excessive nervous and hormonal activity out of keeping with the extent of tissue damage. Thus the physician is faced, in most instances, with a response greater than the need and it behooves him to reduce the response to proper balance with the injury.

I will mention two methods of reducing this general nervous hyperactivity. There are, of course, others. The simplest method is the use of depressant technic as described by Pritchard.[10] He states in effect that constant pressure on deep joint receptors in the area in which a division of the autonomic nervous system communicates with the central nervous system depresses the action of the division. This is roughly similar to MacDonald's and Denslow's methods of gentle pressure slowly applied and slowly released. It can be applied to any or all of the spinal areas. The second method is that of Sutherland[4] who has described a means of returning the cerebrospinal fluid fluctuation to short rhythmic action. The response of the patient may be noted in several ways: a change in respiration, perspiration, and warmth of the skin; local tissue relaxation; and general relaxation. The equanimity and peace of mind of the physician favorably influence the patient's mental state and thus help to achieve the desired result. The above procedures are repeated as often as necessary to maintain the quiet state of the patient. The simplicity of these procedures belies their profound effect.

I would now like to discuss briefly more localized activity. The osteopathic joint lesion is an integral part of the disease process. Whether it is considered the cart or the horse of the disease process depends upon one's emphasis. I prefer to call it the horse because of its relatively important availability as a diagnostic and therapeutic entity and because of its intimate relationship in the spinal and cranial areas with the first synapse of any afferent or sensory nerve in the body. The synapse is of greatest importance because, first, it is one of the few points where the flow of nervous conduction can be influenced and, second, it is normally an area of decrement or reduction of nerve force and thus operates to reduce the passage to the rest of the body of the influence bearing upon it.

In view of its practical importance in the disease process I would like to discuss some of my impressions of a lesion. In acute disease, the acute osteopathic joint lesion regardless of cause may be said to involve a total disturbance of joint function including altered ligament balance, facilitation of nervous elements, acute arthrodial inflammation, and altered bony relationships. Abnormal muscular activity, which includes both hyperactivity as the result of facilitation and distortion of the usual balanced muscular activity, is also present. In the acute stage the lesion is a direct result of an environmental clash of one type or another causing tissue injury. Facilitation is possibly a physiologic mechanism in which synaptic thresholds are lowered in proportion to the extent of tissue injury, enabling increased stimulation of general body response by way of the cortical centers, pituitary and hypothalmus. In the chronic stage the joint lesion remains a total disturbance of joint function including altered ligament balance, lowered nervous activity, chronic inflammation, altered bony relationships, and diminished muscular activity with continued distortion of muscular balance. In this chronic state the lesion protects the body from the effects of repetition of a similar injury while at the same time it, being an abnormality, diminishes the body potential. At this point I wish to state, if the implication is not sufficiently clear, that the lesion process which osteopathic physicians have known and used for so long is an essential part of Selye's general adaptation syndrome and, among other features, accounts for most of the localization of effects of general stress. It is interesting to note that Still also recognized the general effect of stress when he wrote:

> The operator who explores for the true cause of so many deadly effects on the system should keep in mind that any organ when injured by atmospheric changes, wounds, bruises, mental shocks, etc., very often produces such changes as result in death. Local shocks affect the whole system, the nerve and blood supply to every part of the body.[11]

For the purposes of discussion, local treatment might be defined as that treatment which is applied to the site of tissue injury and to the region of the first synapse between the afferent nerve and the central nervous system. The first synapse is in relation to one or more spinal joints. In a sense this relationship also holds true for the cranial joints. The procedure here is to reduce the patient's recently acquired osteopathic lesions, or, in other words, to lower the irritability of the facilitated segments by whatever means experience has shown to be advantageous. Here I would like to say that this is more or less an individual matter among physicians. Everyone improves in his efficiency of application and I would not suggest that anyone change his method except as he alters his concept. I think that manipulative as well as other forms of treatment must be considered an additional environmental factor which may induce reaction beyond the intended therapeutic effect. I make two suggestions in this regard: (1) that treatment should be as gentle as it can possibly be and (2) that except when lowering the general nervous irritability treatment in the acute case should be applied only to lesion areas of recent acquisition. Many acute conditions involve exaggeration of the pattern or reflex affections of it at its weaker areas. I find that gentle manipulation or stretching of tissues whose actions are antagonistic to those of the acutely inflamed areas promotes return to a more balanced state.

Burns[2] has described the effects of correction of chronic lesions as being similar to the pathologic process of production of lesions and it is not wise to inflict this condition upon the patient with acute disease. In acute disease conditions I am not in favor of what is loosely called stimulating treatment because this analysis of disease indicates that the majority of reactions are already excessive in relation to optimum

response. I believe Sutherland's method, as described by Wales,[12] of reducing osteopathic lesions by exaggeration and respiratory cooperation to be a gentle, nonshocking procedure. I also think that MacDonald's and Denslow's method of gentle pressure slowly applied and slowly released is effective in reducing facilitation. In the acutely lesioned state where increased motion and swelling are present it is possible that direct reversal of the mechanics of lesion production, as utilized by Burns[2] is as effective as any other method.

Local activity in acute disease implies inflammation either at the site of tissue injury, at the site of synaptic connections, or in organs involved ultimately in the adaptive mechanism. I believe that most of the signs of inflammation which constitute a localized entity can be ascribed to a single disturbance which may, however, be the result of several influencing factors. This aspect of acute disease will be discussed as a primary process in order to analyze better local treatment. Acute inflammation can be said to be accompanied by an imbalance of arterial supply and lymphatic and venous drainage with resulting circulatory stasis. It is possible that this state exists as a result of general or local nervous, hormonal or toxic factors. Nevertheless, I would recommend any method that would produce an improvement in this circulatory imbalance in preference to a method which would relieve any other single characteristic of inflammation because relief of the imbalance would produce an over-all effect on the process and consequently a speedy recovery. To be more specific, any form of treatment applied to a site of inflammation which increases arterial supply without producing a proportionately greater increase in venous and lymphatic drainage is of questionable value and on occasion has been known to be detrimental. I would like to point out that the applications of heat, the use of poultices, and direct manipulation or stretching of congested tissue may not meet the requirements for reduction and relief of circulatory imbalance.

Now I would like to reiterate briefly some of my ideas in an attempt to formulate a more or less complete approach to treatment of acute disease.

It goes almost without saying that the establishment of the patient's confidence in his physician is one of the most valuable treatment forms available. All no doubt are aware also of the benefits of that peculiar relationship called rapport. It is important not to induce fear in patients, and it is frequently a matter of individual reaction. It is known that the names of some diseases have great reaction-producing potential and often it is better at first to describe the condition in gentle terms. The patient should be informed in accord with the gravity of his illness about the harmful effects of vigorous or prolonged activity of any type, be it physical, mental, dietary, or emotional, as these are all detrimental to recovery. Whenever possible, however, it is better to allow a patient to continue his usual routine of working, eating, and sleeping because marked deviation from this pattern may be a sufficient change of environment to cause him to react unfavorably. With the exception of harsh and continuously irritating environment—and I use this in the very broadest sense of the term—the farther the patient is removed from his usual environment the greater the adjustment he will be forced to make, thus diminishing his energies available for recovery. Natural sleep is probably the most important single factor influencing the individual's recovery for it is during sleep that the body tends to overcome the effects of daily environmental stress.

A fundamental understanding of disease processes as well as the peculiarities of the effects of specific agents such as bacterial toxins, poisons, et cetera, should lead to a reasonably definite plan of approach to each patient, the objective being to have the patient respond in keeping with the extent of his injury. The body may react to varying intensities or types of environment either as a whole or in part. The line of division is certainly variable due to these factors of intensity or character of environment as well as to the receptivity of the body at the site of injury and the degree of decremental effect of the first and other synaptic connections. The degree of reaction to these factors is dependent upon heredity and the effects of past environment. The occurrence of total body reaction is probably much more frequent than usually recognized.

If the precipitating factor is still operating in the environment of the patient it should be eliminated or made impotent if possible. Removal of the effects of recent predisposing factors is of real importance in tempering the patient's reaction to his needs. To emphasize this premise I reiterate that there is a disturbance of body physiology of varying duration preceding the onset of symptoms which is continuous throughout the symptomatic period and which acts as a detriment to the efficient use of the gross defensive mechanism. The disturbance is initiated by those clashes with environment with which the patient is able to cope. It is raised to the point of symptomatic illness as a result of the invasion of the defensive barrier by additional factors such as infection, injury, psychic trauma, et cetera. Unfortunately it is frequently furthered by the unwitting attentions of physicians, nurses, relatives, and friends. In this last respect I am in agreement with Pottenger[13] who believes that diagnosis should be made on the basis of history and physical findings and that laboratory and other aids to confirmation should be used only where needed. Unnecessary use of these procedures causes unnecessary patient reaction and results in prolonging the illness. This is the case all too often.

If osteopathic physicians err in the dosage of manipulative treatment it is almost invariably on the side of overtreatment. Re-examinations should be made more frequently in acute illness than in chronic illness because the reactions of the patient to his surroundings occur more readily and more strongly and these reactions should be treated without delay. Early follow-up examinations frequently reveal disturbances not recognized at the first visit and allow for alteration of tactics if deemed advisable.

It must be remembered that the body is constantly altering either slightly or grossly, that these alterations affect all tissues and fluids, and that the principle of the osteopathic lesion in disease is a facet of the whole and not an isolated entity. Osteopathic manipulative treatment of the individual with acute disease offers important advantages over other forms of treatment because the osteopathic physician can give attention to the whole or to its parts by metered dosage in accordance with the requirements of the patient and the response elicited. I do not maintain that we have achieved perfection by any means, especially from the standpoint of the physician's ability to implement

his understanding of acute disease processes. However, I am sure that the future will bring us greater understanding and greatly improved means of application and that these means will be much more significant if they are fitted to the principles of Still—not because he propounded them but because they are fundamental truths of life.

1298 King St., E.

REFERENCES

1. Eggleston, A. A.: Unpublished lecture.
2. Burns, L.: Pathogenesis of visceral disease following vertebral lesions. American Osteopathic Association, Chicago, 1948.
3. Denslow, J. S.: An analysis of the variability of spinal reflex thresholds. J. Neurophysiol. 7:207-216, July 1944.
4. Sutherland, W. G.: Manual of cranial technique, prepared by R. C. Lippincott and H. A. Lippincott. Edwards Brothers, Ann Arbor, Mich., 1943.
5. Still, A. T.: Osteopathy: Research and practice. Published by the author. Kirksville, Mo., 1910.
6. Selye, H.: Physiology and pathology of exposure to stress. Acta, Montreal, 1950.
7. Still, A. T.: Cited by Sutherland, W.G.: Manual of cranial technique. Edwards Brothers, Ann Arbor, Mich., 1943, p. 5.
8. Northup, G. W.: Philosophy of osteopathic concept. Academy of Applied Osteopathy, Year Book. Edwards Brothers, Ann Arbor, Mich., 1951, pp. 91-93.
9. Pearson, W. M.: A progressive structural study of school children. J. Am. Osteop. A. 51:155-167, Nov. 1951.
10. Pritchard, W. W. W.: A theory of manipulative treatment, in An analysis of the osteopathic lesion, by G. M. McCole. Published by the author. Great Falls, Mont., 1935.
11. *Op. cit.*, ref. 5, p. 16.
12. Wales, A. L.: Ligamentous articular strains and membranous articular strains. Academy of Applied Osteopathy, Year Book. Edwards Brothers, Ann Arbor, Mich., 1951, pp. 73-77.
13. Pottenger, F. M.: Symptoms of visceral disease. Ed. 6. C. V. Mosby Co., St. Louis, 1944.

Distinctive Osteopathic Management of the Convalescent Period*

RAY A. LINNEN, D.O.
Ottawa, Ont., Canada

The convalescent period is that period during which the symptoms of acute disease practically disappear and the patient gradually recovers and is restored to normal or as near normal as is possible for the individual. This period may be one of the most dangerous periods of the patient's illness. As the characteristic symptoms of the acute disease fade away both the patient and the doctor often take the rest of the recovery for granted and prematurely terminate their relationship. The fallacy of this attitude was very clearly expressed by MacBain[1] when he stated, "Once the pathological pattern is set in motion, the process continues even in the absence or neutralization of the original irritation. The response may become the disease . . ."

In order to evaluate intelligently the patient's physical condition during convalescence the doctor must have a thorough understanding of the pathologic processes of the acute phase of the disease just terminated so that he can best assist the patient's body in its return to normal. First the doctor should consider briefly what has happened to the patient's body during the progress of his illness to this point. Has permanent damage been done or are the pathologic processes still reversible? To answer the doctor must consider the following: What has taken place in the human body during this infection? To what extent has the patient's defensive mechanism been able to function? What is the best regime that will assist the body in its total recovery?

Karsner,[2] in discussing vascular changes in inflammation, states that there is a primary and evanescent constriction of the blood vessels which is quickly followed by a lasting dilatation of the vessels. During the period of constriction there is for a short time an increased rate of blood flow; during the period of dilatation the flow gradually slows down. The extent of this slowing is in direct proportion to the virulence of the infection and the body's reaction to it. This statement emphasizes Still's postulate that the minute the circulation of any one part of the body is slowed down disease processes begin or, briefly stated, the rule of the artery is supreme.

It has been demonstrated by Hooker[3] that nervous influences control the caliber of arterioles and probably also of the arteriolar segments of the capillaries. It would seem more than probable, therefore, that the primary vasoconstriction and the earlier stage of vasodilation are due to nervous influences while the prolonged dilatation, paralytic in nature, is due either to decrease of oxygen, increase of carbon dioxide, production of substances poisonous to the small vessels, or a combination of these factors. After considering this information for a moment the doctor can more clearly understand what has taken place in the body and why so many symptoms manifest themselves in various ways.

The ability of the body's defensive mechanisms to cope with the original invasion will be made apparent to the physician during the acute stage of the disease. The rapidity with which the patient shows signs of recovery will be of great assistance in determining the extent of the illness and will largely decide the type of treatment to be applied during the convalescent period.

Members of the osteopathic profession are most fortunate in having at their command a most efficacious method of treatment for aiding the body during its final stage of recovery. At this stage the patient may show no definite clinical pattern by which the condition can be labelled but obviously he is still not well. Many times such a patient is left to his own resources and, despite good nursing care, his recovery processes are slower than anticipated. Unless the

*Presented at the meeting of the Academy of Applied Osteopathy, Milwaukee, July 21, 1951.

utmost care is given at this time a chronic degenerative process may well begin.

What then is the proper procedure of treatment? Keeping in mind the circulatory changes that were mentioned previously — prolonged vasodilation and accumulation of toxic elements—the immediate step is to normalize these two conditions as quickly as possible. Still[4] states that the portion of the nervous system most affected in acute diseases is situated in the region between the diaphragm and the foramen magnum. Lane[5] points out that an examination of the spinal column of a patient suffering from an acute infectious disease will reveal that the muscles housing, protecting, and operating the movements of the individual units of the spine or the vertebrae are tense, stiff, and hard, this unusual stress having been brought about by the toxin of the infection. Whether this toxin acts on the muscles directly or indirectly through the disturbance in the nervous system caused by the toxin makes no difference. The fact is that the entire spine is comparatively rigid. The basis for effective osteopathic manipulative therapy, according to Korr,[6] lies in silencing the somatic components of the lesion complex by abolishing the contracture, spasm, or sustained contracture (and ischemia) of the skeletal muscles in the lesioned segment. Lasting effects are obtained by correcting the mechanical or articular disturbance which imposed the stress. Korr, in discussing the primary and reflex effects of the lesion complex, further states that the important thing is that the somatic component, whether primary or secondary, be accessible and responsive to treatment and that appropriate treatment of this component, by establishing a more favorable balance of neural factors, benefit all the structures associated in the pattern and therefore the entire body.[6]

May I suggest an outline of treatment based on the above facts:

1. Attempt to release the tension found in the soft tissues of the spinal area, paying particular attention to any disturbance of the viscerosomatic reflexes peculiar to the individual patient with specific correction when found judicious.

2. Release the tension found at the areas of the two parasympathetic outlets and use corrective measures when tissues permit. The osteopathic approach helps make available to the convalescent patient the optimum of his own natural resources which have been lessened to some extent by the invasion of bacteria or other environmental forces. The release of soft tissue tension greatly reduces the irritability of the involved spinal segments and hence reduces the facilitation of the viscerosomatic reflex. The physical comfort afforded to the patient by this maneuver has to be felt to be properly appreciated. There is a combination of events taking place in the body following osteopathic manipulative treatment. Nerve tension, whether the result of the disease or psychologic factors, is released with an immediate stimulatory effect on the general circulation.

3. Assist the patient in every way to procure rest. This would include good nursing care, proper bathing, proper ventilation of the sick room, and the evaluation of the patient's problems. It should be remembered that personal problems may cause a great deal of mental unrest and rob the patient of sufficient deep, restful sleep so essential to his body's recovery.

In discussing rest one would be remiss if some comment were not made on the subject of visitors to the sick. Visitors can be classified according to type. Some are beneficial. They bring a ray of hope, exude optimism, and in general raise the patient's spirits. Others are detrimental. I call them "Job's comforters." No matter what the patient's condition, they know of someone who had a similar condition which ended disastrously. They usually question the patient's wisdom in his choice of doctor and hasten to imply that if the patient had chosen differently he would no doubt be progressing much more rapidly. Then there are the indifferent visitors. These folks usually go along with immediate relatives or friends for something to do. Their presence prevents any confidential discussion between patient and close friends or relatives and only leave the patient more exhausted than ever. The doctor who attempts to screen visitors will be taxed to his wits' end. However, it is a problem not to be dismissed lightly.

4. Take all necessary steps to hasten detoxification of the tissues. If the body is to be eased of its load, the four excretory outlets should be given proper care. Daily bathing, frequent changes of bed linen, and proper ventilation of the sick room are procedures directed towards the care of skin and lungs. Daily enemas, where indicated and tolerated, are, in my opinion, the best method of cleansing the colon. Care should be taken however, not to disturb natural routine as long as it is functioning adequately. If enemas are contraindicated some mild mechanical laxative could be used to advantage. The kidneys must be given serious attention because much of the responsibility of ridding the body of waste material falls on these two organs. Laboratory tests of the urine will greatly influence the measures to be taken. Where no permanent damage is evident administration of sufficient fluids such as water and citrus fruit juices to tolerance will suffice. It must be kept in mind, however, that growth in the genitourinary tract of certain bacteria is aided by an alkaline urine.

5. Nutrition of the patient is also of major importance during convalescence. Rest, elimination, and nutrition are very closely related. The following facts were revealed in a report made by the Committee on Convalescence and Rehabilitation:[7]

The patient may or may not have had adequate nutrition up to the time of his illness. Even if he has had adequate nutrition as soon as illness occurs, malnutrition begins. This situation is based on two facts (1) toxic destruction of protein and (2) diminished intake of food because of inability or disinclination to eat. Therefore, every effort should be made to correct these two situations or, better still, prevent them if possible. Obvious is the fact that food offered to a patient is of no value unless it is eaten. If the food is not eaten the doctor must try to ascertain why. Anorexia must be regarded as a challenge rather than an existing consequence of the disability.

As soon as possible semi-solids and solids should be given. Frequent feedings of lesser amounts may be necessary at times, but care must be exercised not to interrupt natural routine.

Dietary essentials are as follows:

Water.—Intake should be controlled by the following criteria: (1) The volume of urine should not

fall below 1,000 cc. in febrile patients. (2) The specific gravity of the 24-hour urine should not exceed 1,020. (3) The skin and subcutaneous tissues should maintain normal elasticity. (4) The tongue and mucous membranes should be moist. (5) There should be no uncomfortable thirst.

Salt.—The water balance of the body is partly controlled by sodium ion concentration. If sodium salts of the body become depleted water is not properly retained and dehydration results and contributes to circulatory failure. The patient will lose thirst, appetite, and strength if the salt is too low.

Most patients unless suffering from congestive heart failure or nephritis with edema should receive at least 5 grains of sodium chloride daily. The average normal diet contains more than this amount.

Protein.—In acute febrile diseases protein wastage may rise to 3 or more grams per kilogram of body weight per day. Therefore, in convalescent patients the importance of adequate protein intake is obvious. Carbohydrates decrease protein loss slightly, but every effort should be made to prevent loss of protein. This can be done by the intake of milk, eggs, and ground meats. One hundred grams or more of protein daily are essential for sick or injured persons. Nothing less than 1 gram of protein per kilogram of body weight per day can be regarded as a safe subsistence ration for an adult.

Carbohydrate.—A small amount of carbohydrate, perhaps 100 grams daily, is necessary to prevent ketosis in human beings. If this amount is not given, protein is broken down to provide carbohydrate.

Fat.—This is the least important item of food in acute disease. Fat comprises the only large store of calories on which the body may draw without depleting essential tissues. In prolonged wasting conditions, fat deposits may become exhausted; therefore, it is advisable to prevent this condition if possible by giving high calories.

The digestive system of most ill people tolerates, digests, and absorbs fat well if it is given in palatable form with suitable carbohydrate vehicles. The best form in which fats can be administered is in cream and butter. It is to be remembered however that where the intake of food is limited, fat is the least important and protein the most important.

Vitamins.—Wohl states that vitamin and similar concentrates must be recognized by every one as a "crutch" to be used on prescription for definite emergencies and then, like a crutch, discarded as soon as possible in favor of dietary self support. The continuous therapeutic use of concentrates such as vitamins or minerals is never justified unless an exhaustive effort is also being made to supply the same essentials from food and rerouting the patients' food habits to include these foods.

Nothing is as effective in preventing vitamin deficiencies as a generous diet. Complete oral mixtures of vitamins, especially brewer's yeast and other satisfactory preparations of vitamin B elements, when given in adequate quantities, may destroy the appetite for food. Therefore, if the illness of the patient is of short duration and if the patient had previously been well nourished, vitamin therapy is entirely unnecessary.

If however the patient shows evidence of malnutrition in any form, vitamin therapy is definitely needed. Daily doses of thiamine (B_1), 10 mg.; riboflavin (B_2), 5 mg.; nicotinic acid, 20 mg.; and ascorbic acid, (vitamin C), 100 mg. are indicated.

Exercise.—As soon as possible the patient should be made ambulant and gradual walking be commenced. The exercise obtained has a decided effect on the improvement of the general circulation and the movement of the tissues hastens the elimination of the waste products therein.

Exercise should be continued until the earliest signs of fatigue manifest themselves. The patient must be taught how to recognize these signs and to take brief rest periods so that he does not become exhausted. If this procedure is followed the patient becomes ambulatory at the earliest possible time and will suffer no strain to his body.

CONCLUSION

Osteopathic management which includes the control of the patient's environment, rest, elimination, nutrition, and reactability is the most efficacious management of what may be the most dangerous period of the patient's illness.

There is no stereotyped technic that is the best technic. Technics must be selected in accordance with the status of the patient, the conditions under which treatment is administered and the personal ability of the physician.

It is more than possible that osteopathic lesions existing prior to the infectious invasion largely determine the locale of the body segments involved and that by their correction, the recurrence of soft tissue tension and abnormal reflexes will be reduced greatly or eliminated.

The distinctive factors in osteopathic manipulative therapy of the convalescent patient are the most potent therapy of our time. The osteopathic physician with the ability to interpret structural findings and to correct them has an advantage that nonosteopathic physicians do not enjoy.

Medico-Dental Bldg.
150 Metcalfe St.

REFERENCES

1. MacBain, R. N.: Body unity—in health and disease. Andrew Taylor Still Memorial Address, 1951. J. Am. Osteop. A. 50:605-610, Aug. 1951.

2. Karsner, H. T.: Human pathology. Ed. 7. J. B. Lippincott Co., Philadelphia, 1949.

3. Hooker, D. R.: Evidence of functional activity on the part of the capillaries and venules. Physiological Rev. 1:112, Jan. 1921.

4. Still, A. T.: Research and practice. Kirksville, Mo., 1910, p. 416.

5. Lane, M. A.: A. T. Still, founder of osteopathy. Osteopathic Publishing Co., Chicago, 1918, pp. 58-75.

6. Korr, I. M.: The emerging concept of the osteopathic lesion. J. Am. Osteop. A. 48:127-138, Nov. 1948.

7. Medicine and the war: Nutritional aspects of convalescent care. J. Am. M. A. 124:1206-1209, April 22, 1944.

8. Wohl, M. G., ed.: Dietotherapy—clinical application of modern nutrition. W. B. Saunders Co., Philadelphia, 1945.

Coronary Accidents and Their Diagnosis and Treatment*

EARL E. CONGDON, D.O.
Flint, Mich.

A major cause of disability or death is hardening of the arteries—arteriosclerosis or atherosclerosis. This process involves principally the blood vessels of the brain, kidneys, and heart. Diseases that may follow as a result of arteriosclerosis include apoplexy, kidney disease, high blood pressure, uremia, and various conditions affecting the heart—angina pectoris, coronary heart disease, and coronary thrombosis. These latter three conditions—angina pectoris, coronary heart disease, and coronary thrombosis—will be the subject of the discussion in this paper. They constitute, perhaps, the most important involvements of arteriosclerosis. Arteriosclerosis of the coronary arteries leads to narrowing of the vessels that carry blood to the heart muscles or to clots within their lumen, both processes which block circulation.

In order to function effectively, the heart muscle is dependent upon an adequate supply of blood brought to it by the coronary arteries. Atherosclerosis, which affects primarily the intimal coat, is characterized in general by increasing accumulations of lipids and increasing fibrous thickening in localized areas of the intima. These processes interfere with the coronary blood flow and decrease the elasticity of the vascular walls thus causing a narrowing of the lumen and finally occlusion. These processes cause ischemia and anoxemia of the myocardium which in their turn induce changes in the heart muscle which impair its functional capacity and eventually lead to symptoms which bring the patient to the doctor.

To the syndrome described above the term "coronary heart disease" is applied. The term "coronary artery insufficiency" or "coronary insufficiency" has become the most widely acceptable functional description for syndromes resulting from an imbalance between coronary arterial blood supply and myocardial requirements. Anoxia of the heart muscle may result from other conditions, such as obstruction to the coronary ostia, anemia, and hyperthyroidism, but the term "coronary insufficiency" as used in this paper implies degenerative arterial disease.

It is the physiological disturbances and not the anatomic lesions which give rise to the symptoms and signs of chronic coronary insufficiency. It is well known that a marked degree of coronary atherosclerosis can exist, even with marked narrowing of the lumina and small areas of occlusion, without giving symptoms. The explanation, of course, lies in the collateral circulation. Insufficiency of the coronary circulation may be divided into two main groups—acute and chronic. The symptoms of the acute form are, of course, more dramatic than those of the chronic variety, but it is most important from a view point of management to determine whether or not a recent infarction has occurred.

It has been said that the difference between angina pectoris and coronary occlusion is 3 minutes. I am sure that nearly every physician has seen cases of intense agonizing chest pain extending much longer than the 3 minute interval—sometimes 1 or 2 hours—and following cessation there have been no evidences of myocardial infarction or even coronary thrombosis. The electrocardiogram has not changed, sedimentation rate remains normal, and the white blood cell count has not been elevated.

*Presented at the Fifty-Fifth Annual Convention of the American Osteopathic Association, Milwaukee, July 19, 1951.

DIAGNOSIS

The more common manifestations of the acute variety of coronary insufficiency without infarction are a sense of pressure or tightness across the chest, a feeling of extreme weakness, or less commonly a profuse sweating, especially of the upper extremities. Symptoms may be referred to the abdomen—there is some validity in the old saying that when a patient complains of epigastric distress, one should look to the heart and when he complains of pain around the heart, one should look to the abdomen. In other cases, the only symptom of an acute episode of chronic coronary insufficiency is paroxysmal dyspnea. It has been said that one should write down the exact words of the patient describing his symptoms caused by chronic coronary insufficiency. They are described in a multitude of terms—some of them bizarre, all of them interesting. Only by the careful writing down of each patient's description of his complaint will one eventually become most familiar with the symptoms indicating both the chronic and the acute stages of coronary insufficiency.

In the acute phase where infarction has occurred, the most common symptom is a prolonged, agonizing pain with the patient presenting a picture of shock, ashen color, profuse perspiration. The pain is relieved only by large doses of a narcotic. It is interesting to note that frequently before a major occlusion occurs that the patient may have a succession of rather rapidly occurring anginal attacks, sometimes extending over a period of a week. This is a most timely warning and should be heeded instantly by the attending doctor and if possible, appropriate measures taken to ward off the impending myocardial infarction.

The more common forms of chronic coronary insufficiency, seen almost daily in physicians' offices, are those pathological processes involving the coronary arteries in which recent cardiac infarction has not occurred. One finds extensive myocardial fibrosis and, not infrequently, the heart muscle may show scars indicating healed infarcts. This is especially true of patients in the older age group who may have so-called silent infarcts. The pathological findings in chronic coronary insufficiency formerly came under the classification of chronic myocarditis. This term is seldom used as the basic pathology is now recognized. The myocardial fibrosis leads to cardiac hypertrophy and to varying degrees of congestive heart failure. Every doctor frequently sees the individual in the age group of 60 to 80 in whom cardiac arrhythmia suddenly develops—usually auricular fibrillation. It is believed that this arrhythmia is precipitated by a "silent" infarct or a marked degree of ischemia. This arrhythmia

affords evidence of a damaged and functionally disordered heart muscle.

In no other disorder is a good history of more help than in disturbances in coronary circulation. Since the diagnosis rests upon the patient's story and the doctor's translation of his story, the interpretation of symptoms to establish a diagnosis of angina pectoris is one of the most important technics in medicine. Applying the label of acute or chronic coronary insufficiency to a patient's illness places a tremendous burden upon the doctor. Unlike many other diseases, such as cancer, chronic coronary insufficiency is not susceptible to chemical, biopsy, or surgical confirmation during life. Frequently, 80 to 90 per cent of the diagnosis of chronic coronary insufficiency lies in the expert taking of the patient's clinical history.

All physicians are quite familiar with a classical attack of angina pectoris: oppressive or constrictive pain in the chest with radiation to the left arm, immediately relieved by rest and/or nitroglycerin. Angina is derived from a word which means "to strangle" and although the variations of patients' descriptions of their chest pain are many, all of them carry the impression that it is a strangling type of pain. It is further described as a substernal pressure that extends upward and that it seems to constrict the chest. It is further described as a burning, a raw feeling. No sharp, jabbing, lancinating pain can be considered angina. The most valuable description is that of substernal pressure pain, sometimes compared to the feeling of an elephant's foot on the chest. The pain may radiate in any direction, but the most usual is down the left arm. Years ago I had a case in which the only pain of chronic coronary insufficiency was in the left sacroiliac articulation. The pain comes in relation to an exciting factor; exertion, cold weather, and frequently smoking to excess appear to induce the attack. Most peculiarly the individual may work hard in the house or in the shop without pain, but on walking any distance at all, especially up a very slight incline, he has extreme anginal pain.

The most important diagnostic problem for the clinician is determining whether the patient has angina pectoris or a myocardial infarction. The cardinal features of myocardial infarction are well known—the pain is agonizing and shock-producing and is relieved only by large doses of a narcotic. Fever occurs in almost every case and rectal temperatures should be taken and recorded twice daily for several days. Elevation of the temperature usually occurs the second day and, in the uncomplicated cases, persists for a week on the average. Increased sedimentation rate, likewise, is a most important sign and is present in most cases. The increase appears on the third or fourth day and persists for about 4 weeks unless some complicating factor intervenes. Leukocytosis occurs early, usually within the first 12 hours and usually persists from 5 to 7 days. Tachycardia and a fall in systolic blood pressure are found in over 80 per cent of patients with myocardial infarction. Changes in the form of the electrocardiogram are present in about 90 per cent, especially if serial records are taken and multiple precordial leads are employed. Gallop rhythm, or reduplication of the first sound at the apex, is heard in about 30 per cent and pericardial friction rub is heard in approximately 20 per cent. The latter may come and go and must be looked for frequently during the first few days.

TREATMENT

Treatment of cases of coronary disease naturally resolves itself into two parts: treatment of the chronic coronary insufficiency or angina pectoris and, second, treatment of the acute coronary thrombosis and/or myocardial infarction. In the treatment of angina pectoris, the procedures are quite standardized. The use of nitrites, especially nitroglycerin sublingually, is first on the list. The usual dosage is 1/150 grain repeated as often as necessary. As high as forty tablets a day have been taken. Patients with angina pectoris should always carrry a vial of fresh nitroglycerin tablets. If the patient is obese, a reducing program should be carried out. I find that a low sodium diet is helpful and is definitely to be recommended. Regulation of activity and habits is most important and it may be necessary to regulate occupation. If the individual's job is irritating, and is producing chest pain, it probably will be necessary to change it. Once the diagnosis of chronic coronary disease has been made, smoking should be greatly curtailed or, much better, completely eliminated. Available evidence suggests that consumption of tobacco is not harmful to the heart of the individual with normal coronary arteries. However, it is well established that extensive use of tobacco produces at least a minor degree of generalized vasoconstriction. Presumably the vasoconstrictor action is caused by nicotine.[1] Because of this vasoconstrictor action, patients with chronic coronary disease should not use tobacco.

A new vasodilator has appeared on the therapeutic horizon in recent years. I refer to khellin.[2] The effective daily dosage ranges from 120 to 240 mg. with an average of 160 mg. According to statistics presently available at least one third of patients with chronic coronary insufficiency receive marked benefit from this drug, but the gastrointestinal irritations arising from its administration preclude its use at therapeutic levels. Therefore, at present its effects are of academic rather than practical interest.

Occasionally intractable anginal pain occurs and will respond only to surgical procedures. In such cases sympathectomy, paravertebral block, or similar measures become necessary.

In my management of angina pectoris (chronic coronary insufficiency), I consider the therapeutic procedures mentioned above as adjuncts. The most potent and important therapy is osteopathic manipulative treatment consisting of thorough mobilization of the thoracic and cervical spine for the direct effects on vasodilatation. The doctors here present are entirely familiar with the proper application of osteopathic manipulative treatment and it is not within the scope of this paper to go into detail. Suffice it to say that it is of prime importance that thorough mobilization or attempted mobilization of the thoracic and cervical spine is a "must" in the proper management of chronic coronary insufficiency.

When cardiac infarction has occurred, the physician is dealing with a major medical emergency. The patient must have absolute bed rest with nurses feeding him, washing his face, hands, et cetera. He should be given opiates and sedatives to the extent that he sleeps constantly. I prescribe a Karell diet for the first few days and later the low sodium diet given in five small meals.

Next in importance is the use of oxygen. All patients with myocardial infarction are placed in an oxygen tent and an earnest attempt is made to maintain the oxygen concentration within the tent at 40 to 45 per cent. At 45 per cent tent concentration of oxygen, arterial saturation of oxygen should reach 95 to 96 per cent. It is true that the mask is more effective and the oxygen concentration can be carried to 70 per cent thereby, but in my experience the mask is unsatisfactory from the standpoint of the patient's comfort. For the first 36 hours following infarction, the patient is given papaverine hydrochloride, ½ grain intravenously every 3 hours around the clock. If ½ grain does not produce a reaction such as flushing, then 1 grain or 60 mg. is used. It is inadvisable to exceed the dosage of 1 grain. After 36 hours, niacin, 100 mg. four times a day, is used instead of papaverine.

The anticoagulants, heparin and Dicumarol, are used routinely in the five following conditions:

1. Severe myocardial infarction with shock
2. Severe infarction with cardiac failure
3. Obesity
4. History of phlebitis or varicosities
5. Pulmonary infarction.

Heparin is used 200 mg. every 12 hours for the first 48. Daily determinations of coagulation times are made while it is being administered. Dicumarol is used concurrently with heparin in the usual dosage of 300 mg. in divided doses the first day, 200 mg. the second day, 100 mg. the third day, and 50 to 100 mg. a day thereafter. Prothrombin time is determined when the patient enters the hospital and daily following the third day.

When the patient has signs of cardiac decompensation as dyspnea, cyanosis, and edema, following myocardial infarction, the question arises as to whether or not digitalis be used. This is an extremely difficult question which has been debated for years. If digitalis is employed it must be used with extreme caution and should be given only after consultation with a physician who is competent in cardiovascular disease. In general, cardiac decompensation following myocardial infarction is best managed by omitting digitalis and rigidly restricting salt, in addition to the routine measures outlined above for the care of acute myocardial infarction.

If auricular fibrillation occurs with myocardial infarction, the question of whether or not to use digitalis again arises. I feel that quinidine sulfate and/or procaine amide are the drugs of choice and in my experience their use has been most successful.

Another drug which should be used with great caution in acute myocardial infarction is aminophylline. It exerts its beneficial effects upon the heart largely through stimulation of contraction, and thus has a transient digitalis-like effect on the myocardium producing a more powerful systole. It can easily be understood that this drug could be dangerous.

Osteopathic manipulative therapy consisting of gentle rib raising, muscular relaxation, and cervical spine traction is started on the fifth day. These procedures are employed for 3 or 4 minutes, sometimes twice a day. Absolute bed rest is continued from 4 to 6 weeks depending on the patient's response to therapy and the response of his myocardium to the healing processes. His progress is checked by serial determination of sedimentation rates and white blood cell counts and by electrocardiograph examinations.

If the above methods of therapy are carried out the physician can rest assured that his patient has had adequate physical treatment, but his job as the physician is still only half done He is as much reponsible for the emotional and economic adjustment of his patient as he is for the diagnosis and therapy. The former phase of the cardiac patient's management is frequently sadly neglected by the private physician. Every cardiac patient must successfully maintain his relationship with his family, his job, environment, and at the same time live within the limitations of his cardiac capacity. Following the diagnosis and therapy of acute or chronic coronary insufficiency, the physician is likely to say, "Take it easy." No sadder choice of words could be made. If the physician cannot define the functional condition and the therapeutic needs for his patient, how can the patient himself carry out this most important procedure? Patients with heart disease can and do work. In fact, it is imperative that practically every cardiac patient, unless his is a class IV,E case,[3] do some work.

During an acute cardiac episode such as coronary occlusion, a short range program should be formulated. The patient must receive reassurance that this minimal activity program is only temporary, but at the time no definite predictions about future occupation, recreation, and family life should be made. The aim is to establish rapport and allay anxiety. The patient's reaction to the short-term adjustment program will be a guide in the long range planning. The doctor should be prepared, if the patient asks, to explain his disability in layman's terms. For example myocardial infarction can be compared to a small rotten spot on an apple. Or should he be a mechanic, his disability can be explained in terms of a block in the oil line to the motor, et cetera.

Following recovery from the acute episode, the patient's cardiac status should be classified[3] and a program worked out for him—one which it is possible for him to follow. It is of the utmost importance for the physician not to forbid performance of some activity which is unavoidable. By giving orders impossible to obey the physician has added to the patient's complications. He will feel guilty because he is doing something against the physician's orders, but something that he is forced to do in order to survive economically. Details about the heart should be underemphasized, and emphasis should be placed on the amount of energy expended by the patient in all phases of his activity—such as his work, his family life, his recreation, et cetera.

Establishing the long-range program should not be attempted in one session. In the first place, detailed information, unless written out, will be forgotten in part, at least, by the patient. Furthermore, the doctor should continue to see the patient occasionally. At each visit some additional phase can be worked out concerning his social and economic life.

The timing of the patient's office calls or examinations is most important. For instance, an elderly individual, if not seen rather frequently for reassurance and guidance, may experience a feeling of rejection and will suffer acutely, psychosomatically speaking, as a result. On the other hand a younger individual with inactive rheumatic heart disease, if seen every month or two, will develop a feeling of dependence on the physician; therefore, he should not be seen

oftener than every 6 months or, probably better, once a year.

The psychological handling of the cardiac patient, either with chronic coronary insufficiency or during and following an acute episode such as myocardial infarction, taxes the ingenuity of every physician. It is the physician's responsibility to avoid establishment of a cardiac neurosis. He must develop a careful psychological approach to these patients, watching his every word when speaking to them or in their presence.

Rehabilitation studies have shown that anxiety about the state of his heart is one of the chief factors which prevents the cardiac patient from working. Work tolerance increases as anxiety is overcome. The physician in his personal relationship with the patient can do much to prevent the development of anxiety.

422 W. Fourth Ave.

REFERENCES

1. Clinico-pathologic Conference: Myocardial infarction terminating fatally. Am. J. Med. 10:221-229, Feb. 1951.

2. Osher, H. L., Katz, K. H., and Wagner, D. J.: Khellin in the treatment of angina pectoris. New England J. Med. 244:315-321, March 1, 1951.

3. Leaman, W. G., Jr.: Management of the cardiac patient. J. B. Lippincott Co., Philadelphia, 1940, pp. 64-65.

ADDITIONAL REFERENCES

Diseases of the coronary arteries. Proceedings, First National Conference on Cardiovascular Diseases, 1950, pp. 79-86.

Gilbert, N. C.: Treatment of coronary thrombosis. Mod. Concepts Cardiovas. Dis. 15: June 1946.

Jezer, A.: A report on the findings made during a three year observation period at the Altro Work Shops, Inc., March 29, 1951.

Kresky, B.: Role of physician in education of cardiac patient. Mod. Concepts Cardiovas. Dis. 20: March 1951.

Pathogenesis of arteriosclerosis. Proceedings, First National Conference on Cardiovascular Diseases, 1950, pp. 77-79.

Sprague, H. B.: Clinical recognition of coronary artery insufficiency. Mod. Concepts Cardiovas. Dis. 15: March 1946.

Yater, W. M.: Long-range care in cases of myocardial infarction and angina pectoris. Mod. Concepts Cardiovas. Dis. 15: July 1946.

Complications of the Distorted Bite

C. PAUL SNYDER, D.O., F.O.C.O., D.Sc.(Ost.)
Philadelphia

With a Section on Fascia of the Head and Neck

ANGUS G. CATHIE, D.O.
Philadelphia

During the period of my specialization I have performed many submucous resections on children and young people under 20 years of age. It is routine practice in my office to correct, under local anesthesia, cartilaginous deformity and other structural pathology and remove lymphoid tissue. However, there have been many patients who have not been completely cured by this specialized procedure. Intensive study of their dental histories indicated that removal of first and second permanent molars had caused locked bite, in which shifting of the bicuspids and cuspids produces an edge to edge relation of the cusps which prevents lateral excursion. This condition results in a twisted deformity of the roof of the mouth associated with a deviated septum and often with diseased sinuses, deafness,[1] and asthma.

Long years of study, research, and resultant experience have convinced me that a normal bite is necessary if the above conditions are to be corrected. Therefore expert dental assistance must be utilized to develop a normal bite as illustrated in Figure 1. A characteristic deformity caused by removal of the 6-year molar is shown in Figure 2.

In my opinion the pathology of distorted blood and nerve supplies caused by abnormal dental function frequently results in the breaking down of nasal passage filters upon which the nutrition of the entire sinus area depends. Diagnosis in such cases is based primarily on the sense of touch. The method of testing the mobility of the horizontal plates of the palatine bone, a procedure which is necessary for diagnosis, is shown in Figure 3.

In a case such as the one illustrated in Figure 4, the left pterygoid process of the sphenoid (back of the third upper molar) will be sore and tender. The pterygoid process on the right side does not often

Fig. 1

Fig. 2

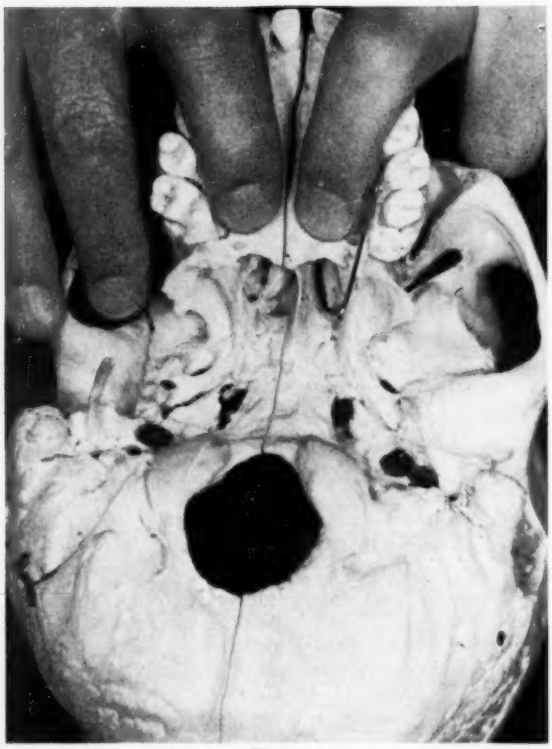


Fig. 3

reflect this sensitivity since the great muscles of mastication cause stress and strain on the maxillary, palatine, and pterygoid process articulations on the opposite side. Stress and strain involve all tissues related to these articulations, including the fascia and particularly the carotid sheath. Invested in the carotid sheath are the carotid artery, the jugular vein, and the tenth cranial nerve (the vagus). Various symptoms arise from stress and strain as illustrated in Figure 4, including vagus nerve symptoms which may simulate cardiac disturbances.

Barnhill and Mellinger[2] note that the carotid bulb is closely connected with the sympathetic nerves which form a plexus over the bifurcation. The bulb and the plexus together form the carotid sinus. The sinus, the anatomical existence of which was ignored until a few years ago, is very important not only because of its role in the physiologic regulation of respiration, but also for that of the circulation. It regulates the blood pressure and, to a great extent, the depth and rate of systole. On it depends the distribution of blood to the muscles and viscera through its effects on peripheral vasomotor states. These facts show that the carotid sinus is essential for normal and pathologic regulation of two of the most important functions of the body—respiration and circulation. Firm pressure on the sinus causes marked circulatory and respiratory symptoms.

A great aid to diagnosis of distorted bite is a thorough study of the patient's facial characteristics. The shape of one eye may be well rounded while that of the other is somewhat flattened. This finding may be associated with a lesion of the maxillary bone with the sphenoid, which must be corrected before dental work is begun.

Correction is accomplished by slowly springing the superior maxillary bone with the *right* forefinger while the *left* thumb and forefinger straddle the wing of the sphenoid on the *same* side (Fig. 5). During this correction it is essential for the patient to *breathe normally.*

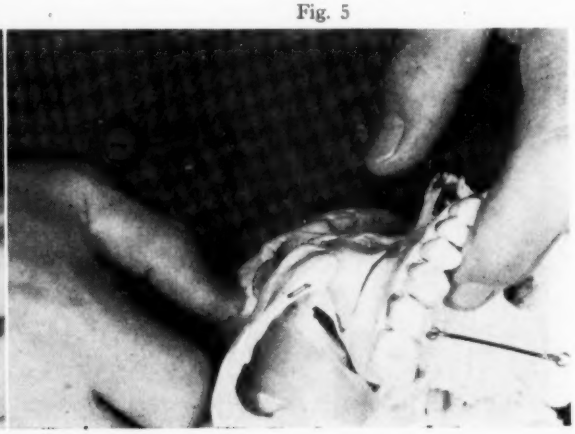
The osteopathic manipulative approach to other conditions such as hypertension, fifth nerve neuralgia, tic douloureux, and Bell's palsy is the same as that described above, *after* any focal points of infection have been removed. The treatment I use is an adaptation of that employed by Northup[3] in the osteopathic manipulative management of hypertension. He has developed a method of manipulative treatment which has proved to be extremely effective. Mild traction in the cervical area is used with slight extension to relax tension in the cervical fascial and the carotid sheath. "A very slow rhythmic motion is made at a slow count of five in each direction and this is continued about two or three minutes or until there is a sense of complete relaxation."

Another important application of normalizing the bite is to improve the nutrition of the external auditory canal. Moist eczema, diseases associated with fungous infections, and dermatitis are highly amenable to treatment after correction of distorted bite.

I am indebted to L. M. Hillerson, D.D.S., for the illustrations of the normal bite (Fig. 1), locked bite (Figs. 6 and 7), the bite planes (Figs. 8a and 8b), and the final dental prostheses (Figs. 9a and 9b), used in therapy of patients with distorted bite and for the following details of dental management.

Fig. 4

Fig. 5



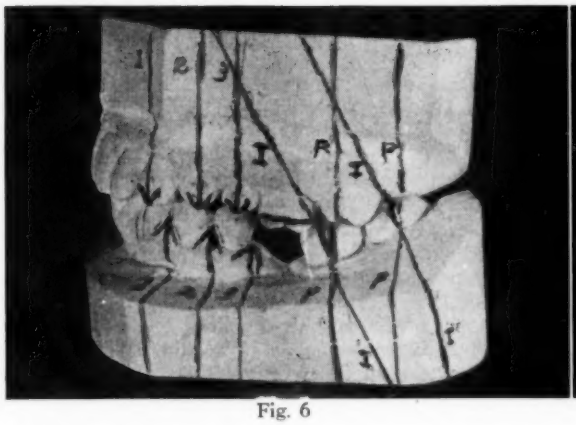


Fig. 6

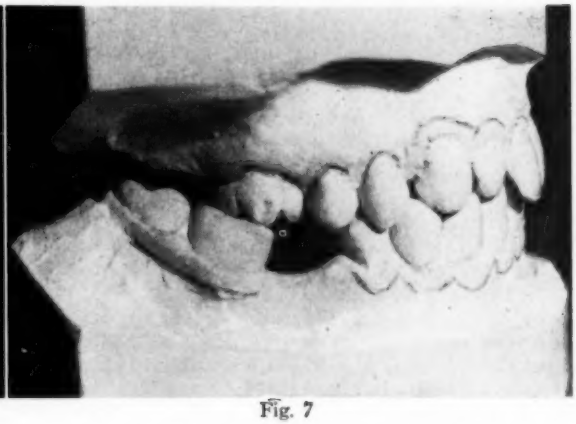


Fig. 7

During the first stage of correction the teeth are reduced to simulate natural wear, and bite planes (Figs. 8a and 8b) are placed on the lower teeth to open the bite and permit complete freedom of motion in any direction. The impressions for these planes are made as soon as possible after osteopathic manipulative correction of the type described above.

The bite planes are worn for several months to maintain correction, to allow accommodation of the muscles of mastication to the new vertical length, and to establish a comfortable, functional position of the temporomandibular articulation. During this period frequent adjustments are made in the temporary prosthesis. When conditions are as satisfactory as circumstances of the individual case seem to permit, the permanent prosthesis are constructed on the basis of the measurements obtained by use of the temporary prosthesis.

The prosthesis illustrated in Figures 9a and 9b is a removable type cast from chrome-cobalt alloy. Rigidity is of prime importance in this appliance as any tipping or give will defeat its purpose. Adjustments of the biting surfaces of the prosthesis are made until the patient's front teeth are in contact. Failure to achieve contact can result in elongation of the front teeth and their eventual loss.

1721 Walnut St.

REFERENCES

1. Snyder, C. P.: Studies in deafness. J. Am. Osteop. A. 48:156-158, Nov. 1948.

2. Barnhill, J. F., and Mellinger, W. J.: Surgical anatomy of the head and neck. Ed. 2. William Wood & Co., Baltimore, 1940.

3. Northup, T. L.: Manipulative therapy in osteopathic management of hypertension. J. Osteop. 57:15-22, Sept. 1950.

Fig. 8a

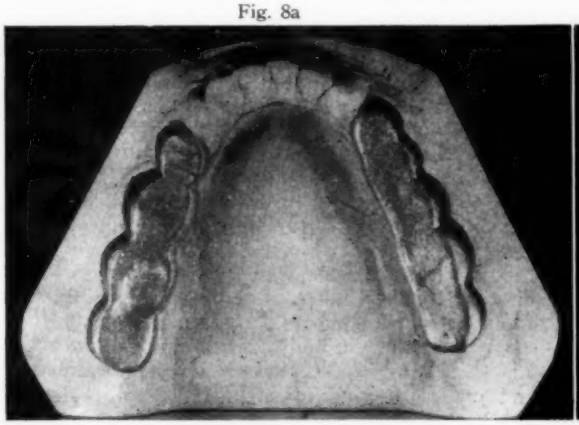


Fig. 8b

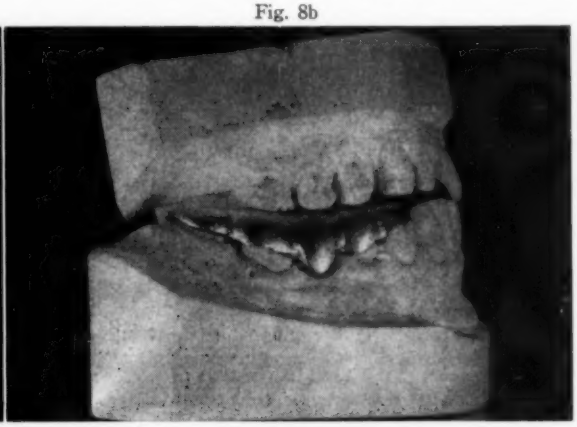


Fig. 9a

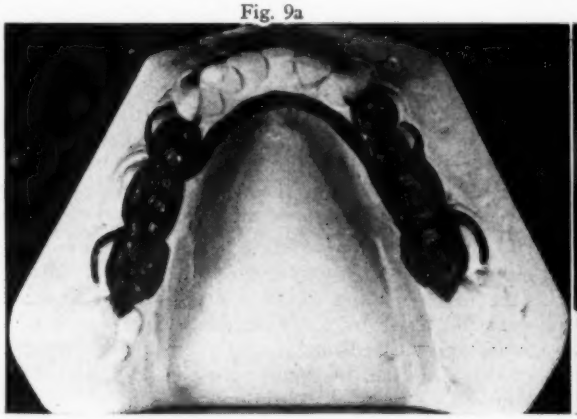


Fig. 9b

Journal A.O.A.
January, 1952

FASCIA OF THE HEAD AND NECK AS IT APPLIES TO DENTAL LESIONS

A Preliminary Consideration

ANGUS G. CATHIE, D.O.
Professor of Anatomy
Philadelphia College of Osteopathy
Philadelphia

In dealing with the visceral portion of the head and with its connections to the various bones of the skull certain fascia must be taken into consideration. Dental lesions and changes in the temporomandibular articulation are, singly or combined, capable of causing varied local and/or distant disturbances. The mechanism responsible for the resulting change is neither a simple nor usually a single one. The answer as to cause and therapy may be through any structure along which force may be transmitted, in any structure upon or through which abnormal tension or traction may be applied, or in those liable to tortional deviation. The related vascular and nerve tissues are to be included in the required study. Because of the interrelationship of the varied parts and systems all must be regarded in the light of the part they play if intelligent and complete therapy is to be employed.

Fascia and fascial specializations are of immediate interest. Fascia with direct and indirect relations to the osseous structures lodging the dental arches includes the following:

1. Superficial layer of deep cervical fascia
2. Pretracheal fascia
3. Prevertebral fascia
4. Buccopharyngeal fascia
5. Pharyngobasilar fascia
6. Pterygoid fascia
7. Lateral pterygoid fascia
8. Interpterygoid fascia
9. Stylomandibular ligament
10. Sphenomandibular ligament
11. Capsule of the parotid gland
12. Capsule of the submaxillary gland
13. Carotid sheath

A brief description of these will be given in the order considered easiest to visualize.

The superficial layer of the deep fascia of the cervical area becomes of special interest since its upward continuation thickens to form the capsules of the parotid and submaxillary glands and attaches along the obliquely coursing mylohyoid line on the internal surface of the mandible. The upper attachments found in relation to the basilar surface of the skull and to the inferolateral region include the zygoma, the posterior boundary of the squamotympanic fissure, the styloid process, and the lower border of the tympanic plate. It is in the last named location that the fasciae forming the anteromedial and posteromedial portions of the parotid capsule attach to the skull.

A thickened portion of this fascia is seen to pass from the styloid process to the posterior border of the mandible as the stylomandibular ligament, separating the parotid from the submandibular gland.

The remainder of the superficial or investing layer of the deep cervical fascia attaches along the zygomatic arch, mastoid process, superior nuchal line, and to the external occipital protuberance and will not be considered here.

The pretracheal fascia is continuous above with the inferior constrictor of the pharynx. This muscle, attaching distally to form a part of the lower part of the pharynx, provides an opportunity to follow the fascia upward from this level to the under surface of the skull.

The pharyngobasilar fascia lines the interior of the pharynx (interior of the three constrictor muscles). It is thin below and thick above where it attaches to the basilar surface of the skull. The line of its attachment from medial to lateral follows the under surface of the basilar portion of the occipital bone just anterior to the pharyngeal tubercle and thence laterally to the sphenoidal spine (spina angularis) and under surface of the petrous portion of the temporal bone in front of the orifice of the carotid canal and lateral to that of the pharyngotympanic (eustachian) tube. It passes along and is attached to the medial pterygoid plate, pterygomandibular ligament, and to the mylohyoid line of the mandible.

The buccopharyngeal fascia covers the exterior of the constrictor muscles of the pharynx and continues anteriorly to cover the buccinator muscle. The three constrictors of the pharynx are thus between two layers of fascia but, since lateral to the midline the superior constrictor terminates in a free concave border that is directed downward, the two investing layers of fascia between which these muscles lie, blend with one another near the base of the skull. Posteriorly in the mid-line a fibrous band extending downward from the pharyngeal tubercle strengthens the constrictors.

The fascia of the pterygoid muscles forming their sheaths is directly attached to the basilar surface of the skull at the site of muscular attachment. There are, however, other specializations in the pterygoid region. The pharynx is separated from the pterygoid region by a heavier fascial membrane, the lateral pterygoid fascia. This extends from the pterygoid fossa to the prevertebral fascia, an important connection from a clinical point of view, which will be discussed more fully later. The lateral pterygoid fascia attaches along a line passing from the lateral margin of the carotid canal to the foramen ovale. The fascia surrounding the orifice of the carotid canal and jugular foramen must be regarded as the upper attachment of the carotid sheath.

Between the pterygoid muscles lies the interpterygoid fascia which arises from the sphenoidal spine (spina angularis). It is attached to the lateral lamella of the pterygoid process. Posteriorly and laterally it presents a free border which, with the neck of the condyle of the mandible, forms an orifice for the passage of the internal maxillary artery and the auriculotemporal nerve. The sphenomandibular ligament is a strengthening of its posterior margin.

A strengthening of fascia is found on the deep or medial surface of the pterygoid internus. Its strongest part lies in relation to the inferior part of the muscle near the angle of the mandible. Here fibers of the stylomandibular ligament continue into the deep fascia of the internal pterygoid muscle while others are attached to the angle of the mandible.

The prevertebral fascia covers the prevertebral muscles and passes laterally over the scalene muscles. It lies over the cervical plexus of nerves and forms the floor of the posterior triangle of the neck. It is fixed above to the under surface of the basilar portion of the occipital bone and passes downward in front of the vertebral bodies into the thorax. Above and in the medial plane it is connected to the buccopharyngeal fascia by some loose areolar tissue which occupies the retropharyngeal space and in which the retropharyngeal lymphatic glands are imbedded.

The carotid sheath is a condensation of fibro-areolar tissue derived from two deep layers of the cervical fascia—the pretracheal and prevertebral. It is attached above to the basilar surface of the skull to surround the carotid and jugular orifices. The contents of the sheath, carotid artery, jugular vein, and vagus nerve become intracranial at the points mentioned. In addition the glossopharyngeal and spinal accessory nerves pass through the jugular foramen and are thus brought into intimate contact with the upper part of the sheath. On the exterior of the sheath the ansa hypoglossi is located and posterior to it and separated from it by the prevertebral fascia is the upper part of the sympathetic trunk of the autonomic system. The upper part of the sheath is attached to the upper part of the capsule for the parotid gland. The longus colli muscle lies posterior to the sheath and prevertebral fascia.

The squamotympanic fissure is of importance due to the related fascial specializations and the close proximity of certain nerves. The upper border of the anterior surface of the tympanic plate forms the floor of the pharyngotympanic tube and the posterior boundary of the squamotympanic fissure. It gives attachment to the fascia that covers the anteromedial surface of the parotid gland.

The fissure is a cleft between the squamous and tympanic portions of the temporal bone. The lateral part may be obliterated by fusion of the tympanic plate with the back of the postglenoid tubercle. The middle part leads up into the tympanic cavity. The anterior process of the malleus is projected into it and the tympanic branch of the middle meningeal artery passes up through it. The medial part, in many skulls, is divided into two parts by a thin strip of bone, the lower part or edge of the tegmen tympani of the petrous portion of the temporal bone. The division of the larger squamotympanic fissure by this strip of bone results in two smaller fissures. The anterior one is the petrosquamous fissure and the posterior is the petrotympanic fissure.

The lower border of the tympanic part of the temporal bone is uneven and sharp and gives attachment to the fascia that covers the posteromedial surface of the parotid gland. The posterior boundary of the squamotympanic fissure gives attachment to the fascia that covers the anteromedial surface of the gland.

When considering the nerves lying in relation to the fascia described, certain important relations stand out rather clearly since symptoms referable to them constitute problems of considerable proportion. A few of these are listed for the purpose of stimulating further thought and consideration from two points of view—the structural relations through which symptoms and physical signs may be produced and through which therapeutic measures can be made to work more competently:

1. The close relationship that exists between the stylomastoid foramen, through which the facial nerve emerges; the parotid gland; and the styloid process

2. The position of the mandibular nerve and its branches in relation to the pterygoid muscles, fascia, and fascial attachments on the basilar surface of the skull

3. The fascial relations at the squamotypanic fissure, which lies close to the structures mentioned above (1.) and can hardly be divided into separate topics

4. The internal and external nerve relations of the carotid sheath and the posteriorly placed upper part of the sympathetic chain

5. The loose areolar tissue so frequently overlooked is to be considered as a "packing material" providing irregular connections and a connective tissue giving support to small and easily damaged neurovascular structures.

The numerous attachments mentioned include many of the more centrally placed points on the basilar surface of the skull. The sphenoid leads in the number of structures mentioned as attaching to it. The petrous and squamous portions of the temporal bone are second, and the basilar surface of the basiocciput is third.

The strength of the muscles of mastication, the strength and thickness of the related fascial specializations, and the strength of the bones to which they attach must be considered if full appreciation of their clinical importance is to be reached. It must be kept in mind that the considerations here mentioned do not include forces that travel through the facial pillars to the cranial buttresses. Changes in the pillars and buttresses may, however, be such that the normal function of the soft tissue mentioned will be impossible.

48th and Spruce Sts.

REFERENCES

1. Barnhill, J. F., and Mellinger, W. J.: Surgical anatomy of the head and neck. Ed. 2. William & Wilkins Co., Baltimore, 1940.

2. Cunningham's Text-book of anatomy, edited by A. Robinson. Ed. 9. Oxford University Press, New York, 1951.

3. Gray's Anatomy of the human body, edited by W. H. Lewis. Ed. 24. Lea & Febiger, Philadelphia, 1942.

4. Morris' Human anatomy, edited by J. P. Schaeffer. Ed. 10. The Blakiston Co., Philadelphia, 1942.

5. Sicher, H.: Oral anatomy. C. V. Mosby Co., St. Louis, 1949.

6. Thorek, P.: Anatomy in surgery. J. B. Lippincott Co., Philadelphia, 1951.

Journal A.O.A.
January, 1952

Reflexes in the Newborn Infant

ARNOLD MELNICK, A.B., M.A., D.O.
Demonstrator in Pediatrics
and
GEORGE H. GUEST, D.O.
Instructor in Neurology and Psychiatry
Philadelphia College of Osteopathy
Philadelphia

Many of the reflexes elicited in the examination of the newborn infant are transitory and by this fact create confusion. Maturation of the nervous system at delivery time is not complete; some reflexes are present which will disappear when nerves become myelinated while others do not appear until that phenomenon has occurred. Reflexes in human existence start with the heart beat—which is reflex in character—before the fourth fetal week.

Numerous reflexes exist in the neonatal period, most of which are not usually thought of in terms of infant reflexes. These include cardiac reflexes, such as the abdominocardiac; intestinal reflexes such as the gastrocolic; respiratory reflexes such as the Hering-Breuer; and the yawning, coughing, stretching, sneezing, vomiting, urinating, and defecating reflexes. Sucking and swallowing reflexes are usually present at birth, but too often are taken for granted in the premature when they may have not yet developed. Those reflexes most often considered in discussions will be dealt with in this paper.

Difficulty arises not only from the fugacity of reflexes in infants, but, as Stone[1] has said, ". . . the axioms of neurology are tremendously modified, if they do not become wholly inapplicable, when the central nervous system of the newborn is under consideration. To begin with, the examination is entirely *objective,* which necessarily reduces the scope and efficacy of a neurological study." Because of the lack of reliability of clinical neurological examination in the newborn, strictly objective technics must be stressed. Study of the reflexes obviously constitutes as objective a clinical appraisal as one can achieve, but even reflexes may be influenced by "nervousness" and certain other extraneous factors.

THE NEWBORN NERVOUS SYSTEM

The child's nervous system is comparable to the decorticate or brain-stem preparation of the laboratory animal. The fetal and subsequently the postnatal development of the nervous system is more or less a reflection of the morphologic needs of an evolutionary process, both in the developing fetus and child and biogenetically speaking. As one progresses up the evolutionary scale, the brain is found to be larger and more definite in relation to the rest of the nervous system. The brain of the developing fetus and child undergoes a like metamorphosis.

Clinical experience, plus certain data obtained from the laboratory, leads one to expect certain bits of evidence to be elicited on examination to indicate the status and intactness of the nervous system. In pathology and injury, both clinical and that induced experimentally, we soon expect certain abnormal responses. A child's nervous system before the age of 2 or 3 years, and perhaps up until puberty, to be more exact, is then to be considered as "not normal" as compared to an adult's. We, therefore, can expect to find the so-called changes or aberrant findings which must be considered "normal" for infancy because of an "absence" or lack of development of certain central nervous structures.

It is now well established that various parts of the nervous system are developed at different age levels. By being developed is meant that the laying down of myelin has taken place. We will not discuss whether myelin is laid down because of function, or function is precipitated because of myelinization; it is important to emphasize that the functioning elements of the nervous system are not evident clinically until myelinization takes place.

The earliest myelinization takes place at 16 weeks of fetal existence in the form of the ventral spinal roots. The last bit of myelinization occurs up to 2 or more years of age when that of the pyramidal system and the correlations centers of the cerebral cortex takes place. Actually there are changes in the nervous system as late as puberty but the exact neuroanatomy of this later development is rather nebulous. It is assumed that the cerebrum or cortex exerts little or no influence upon the lower or more primitive segmental nervous system of the newborn. Langworthy[2] states:

> The reflex activity of the newborn infant could all be mediated by reflex arcs involving the brain-stem and spinal segments which have already acquired their myelin sheath. Indeed, many pathways at birth are well medullated as high as the upper end of the midbrain and the behavior of the newborn is essentially that of a brain-stem preparation.

We can conclude from the statement of Langworthy and from the foregoing discussion that the motor reactions of the newborn baby are entirely reflex. Thus reflex elicitation in the infant is the only reliable source of neurological information, clinically speaking.

From the standpoint of anatomical development at birth, actually the following structures are functioning, that is, they have become myelinated: the spinothalamic tracts to the thalamus, the medial lemniscus, the optic tracts and their afferent fibers to the cerebral cortex, the main constituents of the acoustic apparatus, the spinocerebellar tracts, the vestibular apparatus, the cranial nerves from the third to the twelfth (fully developed), and the dorsal and ventral spinal roots. It might be profitable to mention briefly the central nervous structures that have *not* been myelinated at birth: the cortical; spinal, or pyramidal system; the pontocerebellar structures; the corpus callosum and brachium conjunctivum; the fornix and secondary olfactory connections; the correlation tracts of the thalamus; the frontopontine and temporopontine tracts; and the correlation centers of the cerebral cortex.

THE REFLEXES

This presentation will review several of the commoner reflexes from the standpoint of the physician

who contemplates the newly born child, yet must project his picture of it somewhat into the future. Some abnormal reflex situations will be discussed from the same standpoint. For the sake of simplicity, this approach will be emphasized by a consideration of several important questions: Is the reflex present at birth? How early does it appear? Is it permanent? When does it disappear? What are the pathologically significant variations?

The reflexes which should be tested for during routine newborn examinations are biceps, patellar, Babinski, and Moro. In most cases signs of ankle clonus are sought for. The grasp reflex, tonic neck reflex, and abdominal reflex will be included, as they are fairly important and often need to be elicited. Chvostek's sign will also be discussed.

The patellar reflex is rather constantly found from birth on and persists unless disease or injury supervenes. It may disappear after repeated attempts to elicit it. How early in fetal life it starts is, like so many embryological questions, undetermined. Hooker[3] found that by the twenty-fifth menstrual week, tendon reflexes (patellar and biceps) were present, provided that the infant had breathed for 30 minutes or longer. Those of an earlier age and those without a half-hour of respiration did not have a patellar reflex. Gerscovich and Lerman[4] tested a number of premature infants and twins and found that 30 per cent showed a normal patellar response, 23.3 per cent showed a contralateral response, and 26.6 per cent had a reduced reaction. Only 20 per cent had no reflex and all of these infants were premature. In an earlier study Gerscovich[5] had demonstrated that 77.5 per cent of newborn infants had normal reactions and 20 per cent had contralateral, while the small remainder displayed consensual reflexes, hyporeflexia, or areflexia. One can conclude that the patellar is to be expected in the newborn, but that its absence is not necessarily significant.

Bilateral differences in the patellar reflex should always be considered abnormal, and further investigation should be undertaken. This applies, as well, to any and all deep reflexes or superficial reflexes. Exaggerated patellar reflexes may, in the infant, be accepted as "normal"; however, if they are hyperactive compared to the other deep reflexes of the same child, continued study is in order. Patellar clonus requires similar consideration. It may be called normal in an infant, but if it is found in an older child there is justification for suspicion of a pyramidal lesion, which is usually found with an increase or exaggeration of the reflex.

The pattern of the biceps reflex is similar to that of the patellar.

Lack of myelinization of the pyramidal tracts is directly responsible for the presence of the Babinski sign in the neonate. It is found in most babies at birth, although Bourguignon and Milliez,[6] in examining reflexes shortly after birth, determined that between the first 30 minutes and 4 hours of life, a double reflex exists, with flexion followed by extension. They found that after 4½ hours extension was the usual response. Interestingly, they point out, without trying to explain, that the left reflex matures before the right and that girls mature an hour or so before boys. How long, then, can this be considered a normal reflex? It is such until the nervous system has been sufficiently protected with its myelin sheath, and that usually occurs about the time the child learns to walk. Rand, Sweeny and Vincent[7] place the change of the Babinski reflex to the plantar reflex between 4 and 18 months. Holt and McIntosh[8] believe it occurs between 14 and 16 months, and Watson[9] places it about 300 days. The importance of its persistence beyond this age depends on other clinical findings. When found before the age of neural maturity and accompanied by ankle clonus, some pathology should be suspected. Probably no significance can be attached to it alone before the second year and then only with caution. A positive Babinski reflex, and increased deep tendon reflexes, accompanied by loss of abdominal reflexes, when it occurs in an infant, cannot actually be compared to a true pyramidal tract lesion in a mature central nervous system. What should be stressed here is not amplitude changes in the reflex, but the finding of asymmetry—keeping in mind asymmetry of myelinization.

Popularly called the embrace reflex, the reflex of Moro is misnamed. Stirnimann,[10] reviewing 250 cases, concluded that it was not a simple reflex, but a set of variable reactions sometimes utilizing abduction and sometimes adduction as the chief direction of response. It is typically described as an abduction of all four extremities (the embrace) which may or may not be followed by adduction. The stimulus is a sudden loud noise, loss of support, or any frightening situation. The earliest appearance of the Moro response noted was at 25 fetal weeks in a case cited by Hooker.[3] It appears to be universally present at birth and is particularly valuable as an indicator of unilateral pathology in the form of fracture (especially of the humerus or clavicle), central lesions such as hemorrhage or edema, lower motor neuron lesions, anterior horn cell disease, and nerve injuries such as Duchenne-Erb's paralysis or Klumpke's paralysis. Holt and McIntosh[11] believe it is replaced in 4 to 6 weeks by the startle reflex, but others place the time of disappearance closer to 3 or 4 months. Defective children may exhibit a persistence of this reflex for many years. It may also remain in pyramidal tract pathology.

Knowledge of the grasp reflex in infants is almost universal, even among laity. Placing any object in the palm of the newborn will cause a strong contraction of the hand, often sufficient to support the weight of the infant. Hooker's work[3] has shown that it may first be elicited at the fifteenth fetal week and at the twenty-second fetal week it is strong enough that the arm may be moved by use of it. The reflex is strengthened during sucking and when tension is made on the arm. It persists about 3 to 4 months although there are signs of its weakening at 1 month. There is then a transitional period during which grasp activity is at a minimum, but by 2 years of age complete control of voluntary grasping is possible. Persistence of the grasp reflex creates suspicion of frontal lobe pathology due to absence of myelinization of this area. No definite information is available on the significance of the absence of the grasp reflex in the newborn. However, it is the opinion of the writers that when accompanied by absence of the sucking reflex or difficulty with sucking, it may indicate possible disorganization of the diencephalon.

The abdominal reflex is usually not sought in the routine examination of newborn infants. However, it should be known that it is ordinarily present

at birth, but may not appear until the second to sixth month. Hooker[3] found definite abdominal reflexes at the fifteenth week of fetal life. Therefore, though it may be present at birth, its absence is not significant until the second half of the first year. Absence of the abdominal reflex after that age, along with increased deep tendon reflexes, indicates one of two things — pyramidal tract pathology or a lower motor neuron lesion at the level of the innervation of the abdominal musculature, namely the sixth to the tenth dorsal nerves inclusive.

Tonic neck reflexes serve to maintain the postural *status* of the infant until his muscle coordination will permit freer and more independent use of the eyes and hands. It is provoked by turning the head of the infant to one side. The arm and leg on the side to which the face is turned are extended and on the other side, flexed. It is the typical fencer's attitude, and its occurrence decreases from the time of birth. In 200 cases Mehlman[12] discovered it in 51 per cent on the first day of life but in only 18 per cent on the tenth day. According to Gesell[13] the tonic neck reflex is present from the mid-gestational period (twenty-eighth week) until the twentieth week of postnatal existence. Persistence beyond this age suggests a pyramidal tract lesion.

Two so-called pathological reflexes deserve mention in a discussion such as this: Chvostek's sign, usually thought to be indicative of tetany, and ankle clonus. Grulee and Sanford[14] estimate that Chvostek's sign appears at birth in over 50 per cent of all cases, and this is substantiated by most authorities. This finding should warn the physician that a positive Chvostek's sign in the newborn does not warrant immediate and definite diagnosis of tetany, but merely suggests careful observation and study of the infant. However, appearance of the sign in the tetany age period (3 months to 3 years) is highly suggestive. Chvostek's sign is a contraction of the facial muscles upon percussion of the facial nerve at its most superficial point, over the zygomatic process just anterior to the ear.

Ankle clonus, elicited by sharp dorsiflexion of the foot from sudden release, is estimated variously from being absent at birth to being present in 60 per cent of infants. Slight clonus probably is common, but sustained clonus, especially when accompanied by certain other findings, should be viewed with suspicion. Persistence of ankle clonus, even if slight, over any considerable period calls for critical evaluation of the patient exhibiting it. In a child in whom there are no other pathological findings, myoclonus must be considered.

SUMMARY

1. It has been pointed out that dependence on objective information and the complexity of the objective reflex findings complicate the neurological evaluation of the newborn.

2. The variations in the important reflexes in the newborn are discussed and summarized in Table I.

48th and Spruce Sts.

TABLE I—REFLEXES IN THE NEWBORN

Reflexes to Be Examined	Appearance (Average)	Abnormal Responses	Indication of Pathology	Nervous System Pathology to Be Considered
Patellar and biceps (deep tendon)	Twenty-fifth fetal week	Increase or decrease after appearance	Disappearance	Lower motor neuron lesion
			Hyperactivity, clonus	Pyramidal lesion
Babinski (pathologic thumb and toe sign)	Prenatal	Presence after 18 months	None before second year	
			Persistence	Pyramidal lesion
Embrace (Moro)	Twenty-fifth fetal week	Presence after 3 to 4 months	Bilateral difference	Central lesions, peripheral paralysis, fracture, lower motor neuron lesions, anterior horn cell disease
			Persistence	Defective children, pyramidal lesions
Grasp	Fifteenth fetal week	Presence after 3 to 4 months	Persistence	Frontal lobe amyelinization
			Absence (before 3 to 4 months)	Diencephalic disorganization (?)
Abdominal (superficial)	Fifteenth fetal week (rarely, 2 to 6 months)	Loss after 2 to 6 months	None before 6 months	
			Absence (after 6 months)	Pyramidal lesion, lower motor neuron lesion (sixth to tenth dorsal)
			Increase	Vague frontal lobe lesions (?)
Tonic neck reflex	Twenty-eighth fetal week	Presence after 5 months	Persistence	Pyramidal lesion
Ankle clonus	May be present at birth	Presence after 2 years	Persistence after normally absent	Myoclonus, pyramidal lesion
Chvostek's sign	May be present at birth	Presence after 3 months	Persistence	Tetany

REFERENCES

1. Stone, E. L.: The new-born infant, Ed. 3. Lea & Febiger, Philadelphia, 1945, p. 161.
2. Langworthy, O.: Cited by Ford, F. R.: Diseases of the nervous system in infancy, childhood and adolescence. Ed. 2. Charles C Thomas, Springfield, Ill., 1945, p. 58.
3. Hooker, D.: Fetal reflexes and instinctual processes. Psychosom. Med. 4:199-205, April 1942.
4. Gerscovich, J., and Lerman, N.: El reflejo patelar en el lactante prematuro y en los nacidos gemelares. Semana méd. 1:131-134, Jan. 30, 1947.
5. Gerscovich, J.: El reflejo patelar en el lactante. Semana méd. 2:1064-1067, Nov. 30, 1944.
6. Bourguignon, G., and Milliez, P.: Réflexe plantaire et chronaxie dans les premières heures après la naissance chez l'homme. Compt. rend. Soc. de Biol., 138:776-779, 1944.
7. Rand, W., Sweeney, M. E., Vincent, E. L.: Growth and development of the young child. W. B. Saunders Co., Philadelphia, 1946, p. 254.
8. Holt's Diseases of infancy and childhood, revised by L. E. Holt, Jr., and R. McIntosh. D. Appleton-Century Co., New York, 1940, p. 959.
9. Watson, J. B.: Behaviorism. W. W. Norton & Co., New York, 1925, p. 106.
10. Stirnimann, F.: Uber den Moroschen Umklammerungereflex beim Neugeborenen. Ann. paediat. 160:1-10, Jan.-Feb. 1943.
11. *Op. cit.*, ref. 8, p. 32.
12. Mehlman, J.: The tonic neck reflex in new born infants. J. Pediat., 16:767-769, June 1940.
13. Gesell, A.: The embryology of behavior. Harper Bros., New York, 1945, p. 54.
14. Grulee, C. G., and Sanford, H. N.: The newborn, in Brennemann's Practice of pediatrics. W. F. Prior Co., Hagerstown, Md., 1942, Vol. 1, chap. 42, p. 17.

Postoperative Pulmonary Infarction

An Analysis of Contributing Factors

JOSEPH E. GILETTO, D.O.
Yeadon, Pa.

INTRODUCTION

In an era of ever-increasing knowledge, the physician has come to realize the importance of present-day trends in the healing arts. He is constantly challenged by disease processes, symptoms, and ominous signs that threaten effective prevention of morbidity and mortality. Through the years postoperative pulmonary infarction, a nonrespector of patients, has proved a nemesis to the internist and to the surgeon. The seriousness of this entity lies in its perpetual presence at potential levels. That this problem is a reality which insults the human economy is well known. Often it is the cause of sudden death.

In reviewing the evolution of pulmonary infarction, one is obliged to delve into a myriad of sequential events. It is my opinion, therefore, that practical investigation should be based upon anamnestic and clinical appraisal of the patient and not upon behavior of fixed tissue in the experimental laboratory. It is my belief that clinical solutions should be sought by surveying the sick as they are, without limiting physiologic processes in order to attain a conclusion.

A total of 1,010 major operations were performed in a 10-month period from June, 1950, to March, 1951, at the Osteopathic Hospital of Philadelphia. Postoperative pulmonary infarction developed in 10 patients, an incidence of 0.99 per cent.

Zilliacus[1] reports deep venous thrombosis or sudden pulmonary embolism occurred in 646 (0.51 per cent) of 125,524 surgical patients in twenty clinics in Sweden during the year 1940 to 1945.

DIAGNOSIS

The criteria for diagnosis consisted of the following clinical findings: sudden seizure of chest pain and/or dyspnea, elevated temperature and pulse and respiratory rates, harsh breath sounds, pleural friction rub, and reduction in blood pressure in the postsurgical patient. Diagnosis was said to be well established when the clinical findings were corroborated by radiographic demonstration of pleural reaction with segmental atelectasis. Leukocytosis with neutrophilia occurred in all but one case. As a rule, the clinical picture antedated positive roentgen findings by 24 to 48 hours. In one instance, radiologic evidence was negative until the tenth day after infarction occurred.

INCIDENCE

All the patients who developed infarction were white. The sex ratio was 7:3, males predominating. Ages of patients ranged from 40 to 70 years with a mean age of 56.2 years. The patients varied from 122 to 195 pounds, with an average of 157.5 pounds.

TYPE AND DURATION OF SURGERY

Four of the 10 patients underwent gastrointestinal surgery, 4 had orthopedic surgery, 1 had a urological operation and 1 underwent both urological and orthopedic procedures. Abdominal procedures were more frequently complicated by infarction when the surgery involved the upper gastrointestinal tract. Patients over 50 years of age are those most liable to postoperative thrombosis. Apperly and his associates[2] have found that thrombosis is most common following extensive pelvic and abdominal surgery. Thrombosis and embolism occur most frequently after operations on the bladder and prostate, the stomach, uterus, colon and rectum, biliary tract, appendix, and inguinal hernia, and after severe fractures of the lower extremities.[3] The incidence is considerably lower after operations on the head, neck, and throat. Since postoperative thromboembolism follows operations on abdominal viscera in a high percentage of cases, it seems fair to assume that opening the abdominal cavity may be a factor of considerable importance in the development.

Duration of operation in our series varied widely but in only 2 instances did it last for more than 1½ hours (Table 1). Ochsner and his coworkers[4] have demonstrated that surgical procedures reduce the blood clotting time. The incidence of intravascular thrombosis tends to be proportional to the duration of surgery; however, our findings did not always follow this tendency. The average duration in orthopedic operations was 1 hour and 15 minutes and 40 per cent of infarctions occurred in orthopedic patients.

TYPE OF ANESTHESIA

Fractional spinal was employed in 6 patients; 2 received heavy Nupercaine and procaine, 2 Pontocaine and glucose, and 1 Pontocaine only. The significance of spinal anesthesia in pulmonary infarction has not been established. On the other hand, intravenous Pen-

TABLE I

Race	Sex	Weight	Age	Surgery	Duration	Anesthesia
W	F	163	52	Cholecystectomy; lysis of adhesions	3 hrs.	Spinal,* Pentothal sodium
W	F	122	50	Cholecystectomy	1 hr. 35 min.	Spinal*
W	M	165	50	Ostectomy—tibia	15 min.	Pentothal sodium
W	M	145	70	Oil myelography	———	———
W	M	175	49	Lumbar hemilaminectomy, lumbosacral arthrodesis	1 hr. 15 min.	Pentothal sodium, curare
W	M	142	59	Subtotal gastrectomy	4 hrs.	Spinal,† Pentothal sodium
W	M	183	40	Hemilaminectomy,	———	Pentothal sodium
				Transurethral resection	8 min.	Pentothal sodium
W	M	150	68	Prostatectomy	1 hr. 15 min.	Spinal‡
W	F	135	66	Exteriorization of large bowel	1 hr.	Spinal†
W	M	195	58	Removal of spinal cord tumor	1 hr. 15 min.	Pentothal sodium, curare

Note: Weight given in pounds. *Heavy Nupercaine and procaine. †Pontocaine and glucose. ‡Pontocaine.

tothal sodium was the anesthetic of choice in 4 patients who developed the complication. In two of these, the action of Pentothal sodium was potentiated by the use of curare. The action of curare is both peripheral and central. The reduction in air moved per breath is probably a manifestation of the depression of the myoneural junction. The central nervous system effects of curare produce slowing of the respiratory rhythm; acceleration of the first phase of inspiration; prolongation of inspiration after the first phase has been completed; interpolation of small, fast, irregular, ineffective respiratory cycles into the sustained portion of inspiration and the active phase of expiration; and depression of costal and diaphragmatic breathing.

CONSTITUTIONAL STATUS

There are many factors to be considered in thromboembolic phenomena. An outstanding one is predisposing cardiovascular disease. At best, the patient with arteriosclerotic heart disease is below par for surgery. A combination of unfavorable circumstances in the predisposed patient can readily culminate in thrombosis and infarction. Careful scrutiny and management may reduce such accidents.

Investigation had not advanced too far before it was realized that intravascular thrombosis is not an expression of set clinical patterns. The mechanism is obscure. An equal number of patients considered good operative risks and those predisposed developed infarction. Arteriosclerotic heart disease was present in 2 patients, one of whom had pronounced aortic sclerosis. Compensated mitral valvulitis was an underlying disease in a male. One of 2 patients with arterial hypertension had neither cardiac nor renal insufficiency. However, he had a familial history of thromboembolism and his was one of the two fatal cases in our series.

CONDITION OF LEG VEINS

In the absence of varicosities, muscular pains, palpatory tenderness, local edema, Homan's sign, and pigmented eczema, it was felt that thrombophlebitis and phlebothrombosis were clinically nonapparent. Nine patients manifested no evidence of vein pathology. Atrophy of leg muscles was present unilaterally in 2 patients.

In summary the factors which encourage thrombosis are, first, inflammation of the vein wall, a matter of great potential importance and as yet little understood; second, depletion of the circulatory fluids, important but preventable; third, slowing of the venous return from the legs, which may be due to an enfeebled circulation, the reclining position in bed, and increased abdominal tension. Any or all of these influences are aggravated by those local anatomic peculiarities which favor thrombosis in the upper femoral and iliac veins.[5]

In only one patient, a female, was there exemplified the popular clinical axiom of "varicose veins—phlebothrombosis—thrombosis—pulmonary embolism." The belief that all pulmonary infarctions arise from pathology of veins of the extremities must be abolished if we are not to be lulled into a false sense of security.

PREOPERATIVE X-RAY OF THE LUNGS

In all patients given general anesthetics preoperative pulmonary roentgenography is a routine procedure. Altered vascular pattern and radiability were seen in 2 cases. Radiography of the pulmonary system teaches many things. It reflects activity remote from the lung structure itself, for example, blood and cell chemistry changes that stem from renal, hepatic, pancreatic, and antigenic diseases. The underlying mechanism might be hypoproteinemia with its confusing sequelae. It is my contention that much can be done to offset complicating thrombosis in these instances.

TABLE II

Condition of Leg Veins	Constitutional Status	Presurgical Chest X-Ray
Apparently good—9	Good—5	Negative—7
Poor—1	Moderate arterial hypertension with no cardiac or renal disease; familial history of thromboembolic disease—1	Accentuated vascular pattern throughout both lungs—1
Atrophy of leg muscles—2	Arteriosclerotic heart disease, one of whom had pronounced aortic sclerosis—2	Altered pulmonary interstitial and vascular ranges—1
	Nephrosclerosis—1	Not ordered—1
	Compensated mitral disease—1	

INCIDENCE AND ETIOLOGY

Few situations are more dramatic than that seen when a convalescing patient is stricken with acute pulmonary embolism. This is known to be a frequent complication of many diseases. Zimmerman, Miller, and Marshall[6] found pulmonary emboli in 6.1 per cent of 5,588 autopsies. Most incidental emboli were discovered in medical patients, but fatal emboli were three times as frequent in surgical as in medical patients.

According to Shapiro and Rigler[7] the increased frequency of the diagnosis of pulmonary thromboembolic conditions is due to better diagnostic criteria and greater attention given to this entity. Clinical evidence has made it apparent that in individuals with normal circulation pulmonary embolism does not necessarily result in hemorrhagic infarction. In many cases of major pulmonary artery thrombosis sudden death occurs and infarction does not develop. However, there have been a few cases in which patients survived without subsequent evidence of infarction. Following prolonged roentgen studies, Westermark[8] has concluded that hemorrhagic infarction occurs only if there is occlusion of both the bronchial and pulmonary arteries. Baldridge[9] has stated that pulmonary embolism does not produce infarction in the presence of adequate collateral circulation. Undoubtedly this fact explains the high incidence of infarction in those predisposed by cardiovascular sclerosis. Infarction is most common in individuals in the arteriosclerotic age group.

While postoperative shock and infection are well controlled by the use of blood, plasma, parenteral fluids, and antibiotics, thrombosis has increased despite the measures that have been instituted to prevent it. In the Osteopathic Hospital of Philadelphia, osteopathic manipulative therapy has had no apparent influence upon its occurrence. Phlebothrombosis is popularly believed to be the most dreaded offender. Two factors operate. Increased blood coagulability is a predisposing factor and circulatory stasis a precipitating one.

Tissue trauma increases blood coagulability. Atraumatic technic in operative procedures has diminished tissue damage. Murray and MacKenzie[10] stress gentleness and care at operation to prevent excessive tissue damage and to limit the amount of thrombokinase liberated. Aside from this, little could be done to prevent the increased coagulability in surgical patients. It is possible that the routine use of anticoagulants could avert many thromboses. However, routine administration of these drugs is dangerous because of possible resultant hemorrhagic tendency.

Phlebothrombosis probably never occurs without slowing of the blood stream. In the past, Walters[11] at the Mayo Clinic suggested the use of thyroid extract to increase velocity of blood flow.

Statistics published by Charity Hospital of New Orleans and Massachusetts General Hospital support the contention that despite the prophylactic measures taken against circulatory stasis—pressure bandages, early ambulation, heat applied to lower extremities, breathing exercises, et cetera—venous thrombosis is increasing in incidence. Ochsner and his coworkers[4] point out that even prophylactic femoral vein ligation as practiced so widely at the Massachusetts General Hospital has not prevented increased incidence of pulmonary embolism as demonstrated by the findings of Roe and Goldthwaite. They are seriously considering the role of the almost universal use of antibiotics, because there is some evidence that they increase blood coagulability. Seven of the 10 patients in our series received penicillin alone or in combination with streptomycin, sulfonamides, or aureomycin during the postoperative period. At present, one cannot detect all cases of venous thrombosis because approximately one-half the patients with thromboembolism exhibit no clinical evidence of the condition.

Investigations carried out for the past 2 years at Charity Hospital suggest that intravascular clotting is produced by a relative disproportion between prothrombin and antithrombin blood levels.[4] With correction of antithrombin deficiency which occurs in a high percentage of patients submitted to surgery, the incidence of thromboembolism may be reduced. Antithrombin therapy produces no hemorrhagic tendency and it possesses, therefore, a distinct theoretical advantage over the anticoagulants. However, it is strongly emphasized that in patients with lesions predisposing to venous clotting which have existed prior to antithrombin administration and in those in whom venous thrombosis has already occurred, administration of antithrombin will *not* prevent detachment of the clot.

We can infer that pulmonary infarction is not always the result of the propagation of a clot originating from lower extremity phlebothrombosis. Constitutional status is certainly a serious consideration and cardiorespiratory dynamics have much to do with smoothness of blood flow. A sudden serious change in flow or less severe changes over longer periods favor intravascular clotting. It is known that changes in blood velocity produce eddy currents. These in turn may cause disintegration of platelets and thus set in motion the machinery of fibrin formation.

Boyd[12] states that thrombosis is the result of an upset in a delicate balance. This upset may be caused by several things, some of which are known and some unknown. Three known factors are: injury to the intima, slowing of the blood stream, and changes in the chemical composition of the blood. Postoperative pulmonary infarction is, then, no longer to be considered a problem of anatomical locality, but one related to total structure and function.

As mentioned above the arteriosclerotic age group is especially susceptible. These patients have altered cardiovascular structure and dynamics. Administration of vasopressor agents produces marked variance in circulatory rhythm and imbalance of homeostasis. Therefore, the injudicious use of such drugs as epinephrine, Methedrine, ephedrine, Neosynephrine, curare, et cetera, should be abandoned in the effort of preventing postoperative complications.[13] The promiscuous use of whole blood and blood substitutes is not without danger. Transfusions increase the tendency to thrombosis.[4] Respiratory depressants, the long-acting barbiturates, and intravenous Pentothal sodium alter thoracic excursions and tend to render the vascular system anoxic. Necessarily venous return to the right heart is slowed and venostasis results.

Mention of fluid balance and ionic equilibrium must be made. The literature dealing with these subjects reveals little conclusive evidence of complete understanding of them. However, certain facts concerning extracellular sodium are clear. Normally the kidneys, influenced to some degree by various hormones including the adrenal cortical steroids, adjust urinary excretions of sodium and water to maintain constant balance of this cation. Considerable losses of sodium in a short period of time produce circulatory collapse. Hypertonicity induced by deficits of water affects the nervous system and marked hypertonicity may cause respiratory failure.[14] The use of sodium restriction, diuretics, and cation exchange resins in cardiac patients has gained popularity. The abuse of these materials must be meticulously avoided and observation for signs and symptoms of hyponatremia

must be unceasing. Disturbed cellular chemistry is reflected early by the appearance of edema within the lung structure. This is a forerunner of pulmonary embolization in a large number of cases. Much can be done to treat the chemical disorder early and so interrupt the cycle of events that eventually lead to pulmonary infarction. Fifty per cent of infarctions in our series occurred during hot, humid weather. It might be suspected that this climatic condition tends to render the blood stream more viscid. Perhaps the more liberal use of parenteral fluids might be of help in combating not only dehydration but also the cardiovascular depression so often seen in the surgical patient during summer months due to loss of double positive sodium.

TABLE III—SEASONAL OCCURRENCE

Month	Average Temperature	Relative Humidity	Number of Infarctions
July	75.9	67.5-70.7	3
Sept.	64.8	78.5	2
Oct.	60.5	74.7	1
Dec.	35.2	68.3	1
Jan.	37.5	69	1
Feb.			1
Mar.	43.2	66.3	1

CONCLUSIONS

The incidence of postoperative pulmonary infarction is significantly high. The factors to be considered can be grouped into two major classes: (1) Factors predisposing to intravascular clotting, and (2) systemic alterations predisposing to pulmonary embolism with subsequent infarction.

Of the many and diverse factors which have been shown to predispose to intravascular clotting, two appear to be pre-eminent since they coexist in more than 80 per cent of all embolisms. They are: (1) The age of the patient is above 40 years, and (2) the patient has been confined to bed by illness or operation. Since the treatment of thrombosis and its associated symptoms is far from satisfactory and there is little assurance of a successful outcome once embolism has occurred, the logical approach to these problems is prophylaxis. It is not within the province of this paper to elaborate upon the treatment of thrombophlebitis and phlebothrombosis except to emphasize that early diagnosis and prompt institution of treatment remain the sine qua non.

Limitation of clinical considerations to the venous system of the lower extremities constitutes a scientific fallacy. Half of our patients with complicating infarction had cardiovascular disease of moderate to severe intensity and no tangible evidence of peripheral vein disease. It is timely to direct more attention to presurgical selection and preparation and postoperative management of those candidates above the age of 40 years, and all of those with systemic disease predisposing to thrombosis. The correction of blood chemistry and composition is imperative since alterations of them are part and parcel of constitutional disease. Equally important is the care of the patient on the operating table, attempting to minimize the use of vasoconstrictor agents, and proper selection of parenteral materials as to type and amount. There are no hard and fast rules. Each patient presents an individual problem. The etiology of postoperative pulmonary embolism is unknown. Prophylaxis is the best treatment.

1053 Duncan Ave.

Acknowledgment

This paper is taken from a thesis written during a residency under the late Dr. Ralph L. Fischer. His efforts made this work possible.

REFERENCES

1. Zilliacus, H.: Cited by Marple, C. D., and Wright, I. S.: Thromboembolic conditions and their treatment with anticoagulants. Charles C Thomas, Springfield, Ill., 1950, p. 68.
2. Apperly, F. L., *et al.*: An electrical method for the prevention of venous thrombosis and pulmonary embolism. Am. J. Surg. 81:451-452, April 1951.
3. Kirby, C. K.: Venous thrombosis and pulmonary embolism. S. Clin. North America 26:1389-1403, Dec. 1946.
4. Ochsner, A., *et al.*: Newer concepts of blood coagulation, with particular reference to postoperative thrombosis. Ann. Surg. 131:652-665, May 1950.
5. Homans, J.: Venous thrombosis in lower limbs: its relations to pulmonary embolism. Am. J. Surg. 38:316-326, Nov. 1937.
6. Zimmerman, L. M., Miller, D., and Marshall, A. N.: Pulmonary embolism; its incidence, significance, and relations to antecedent vein disease. Surg., Gynec. & Obst. 88:373-388, March 1949.
7. Shapiro, R., and Rigler, L. G.: Pulmonary embolism without infarction. Am. J. Roentgenol. 60:460-465, Oct. 1948.
8. Westermark, N.: Roentgen studies of the lungs and heart, edited by L. G. Rigler, University of Minnesota Press, Minneapolis, 1948.
9. Baldridge, W.: Pulmonary emergencies. Lecture at Eastern Study Group of American College of Osteopathic Internists, March 1951.
10. Murray, G. & MacKenzie, R.: Postoperative thrombosis and embolism. Am. J. Surg. 57:414-428, Sept. 1942.
11. Walters: Cited by Murray, G., and MacKenzie, R.: *Op. cit.*, ref. 10.
12. Boyd, W.: Text-book of pathology. Ed. 4. Lea & Febiger, Philadelphia, 1943, p. 72.
13. Lundy, J. S.: Clinical anesthesia. W. B. Saunders Co., Philadelphia, 1942, p. 608.
14. Danowski, T. S.: Newer concepts of the role of sodium in disease. Am. J. Med. 10:468-480, April 1951.

ISOLATION OF ENCEPHALITIS VIRUS FROM WILD BIRDS

Researchers of the Communicable Disease Center, Public Health Service, have isolated the virus of encephalitis from wild birds under natural conditions, it was announced recently by Leonard A. Scheele, Surgeon General of the Public Health Service, Federal Security Agency.

It has been suspected for many years that birds harbor the virus, but this is the first time that their role definitely has been proved. The encephalitis unit at Greeley, Colorado, has reported the isolation of virus twice from redwing blackbirds and once from magpies. The virus, which is a type known as Western equine, also was recovered from two batches of mosquitoes and one batch of mites, for a total of six isolations, all from Weld County, of which Greeley is the county seat.

Man and horses are infected with the virus after being bitten by certain species of mosquitoes. Mites, lice, and ticks also become infested, adding to the complications involved in studying the disease. Wild birds, now proved to harbor the virus, act only as carriers, from which mosquitoes can acquire the virus.

According to Public Health Service figures, the incidence of encephalitis in the United States increased in 1950 for the second consecutive year, possibly because of better recognition of the disease.

In 1948 there were 575 reported cases; in 1949, 781 cases; and in 1950, 1,051 cases. Many thousands more are believed to have gone unrecognized, or to have been erroneously diagnosed as poliomyelitis.

THE JOURNAL OF THE
AMERICAN OSTEOPATHIC ASSOCIATION

Published monthly by the American Osteopathic Association

Publication Office, 100 S. Kenilworth Ave., Oak Park, Ill.
Editorial Office, 212 E. Ohio St., Chicago 11, Ill.
Address all communications to the Chicago Office

RAYMOND P. KEESECKER, D.O. ..... Editor
KATHERINE BECKER, A.B. ..... Assistant Editor
R. C. McCAUGHAN, D.O. ..... Executive Secretary
CLAYTON N. CLARK, D.O. ..... Business Manager
ROSE MARY MOSER ..... Treasurer

EXECUTIVE COMMITTEE

PRESIDENT ..... FLOYD F. PECKHAM, D.O., Chicago
PRESIDENT-ELECT ..... DONALD V. HAMPTON, D.O., Cleveland
PAST PRESIDENT ..... VINCENT P. CARROLL, D.O., Laguna Beach, Calif.
FIRST VICE-PRESIDENT ..... HOBERT C. MOORE, D.O., Bay City, Mich.
CHAIRMAN PROFESSIONAL AFFAIRS ..... ALLAN A. EGGLESTON, D.O., Montreal, Canada
CHAIRMAN PUBLIC AFFAIRS ..... JOHN W. MULFORD, D.O., Cincinnati

Subscription . . . . . Ten dollars a year in advance

Vol. 51 January, 1952 No. 5

THE PROFESSION, MIDYEAR

The far-reaching interests and the diversified responsibilities of the osteopathic profession are clearly revealed by the agenda for the midyear meeting, December 14 to 17, of its Board of Trustees held for the first time in the Central Office home.

The completion of the third floor of the A. T. Still Memorial Building this November gave the Board the opportunity of arranging dedication exercises for their own spacious and beautifully appointed room which will house all such future meetings. Selected guests were invited and the exercises were presided over by Dr. Floyd F. Peckham, President of the American Osteopathic Association. The actual setting aside of the room to its avowed purpose was done in an address by Dr. Phil R. Russell, Fort Worth, Texas, Past President of the Association, chairman of the Committee on the Central Office Home, and prime mover of the original building project.

Following the ceremony, the Board moved without delay to the business at hand, which occupied the period from the time of dedication until December 17 at 1:30 p.m. The sessions were long, but the agenda moved with spirit, and with as little delay as is possible in any democratic body. The accomplishments at adjournment bespoke an experienced and balanced group, ready to merge individual judgment into unified action, to the attainment of definite goals. A close observer noted no surprising nor particularly newsworthy proceedings upon the part of the profession's chief administrative and executive body. Startling action and consequent headlines are not necessarily synonymous with significant action upon the part of individuals, organizations, or states. But this 1951 midyear meeting was basically significant. That significance grew out of the fact that the osteopathic profession is a group of individuals dedicated to the healing arts, with influence felt in every sector of American life that has to do with public welfare. This has become an established fact, still unknown to many of its own members, particularly those who withhold themselves from its organizational life or fail to keep themselves informed about their own profession. The osteopathic profession is no longer merely the shadow of its physicians. It has become a distinct entity. The Board acted for that entity.

The widespread activities of this profession can best be illustrated by examples taken from the Board agenda: Take the matter of colleges. The educational program of the profession is a broad one for it involves six colleges, scattered over areas as far distant as Philadelphia and Los Angeles. Osteopathic colleges themselves are no longer isolated units, going their separately appointed ways, but they are institutions of education at a professional level, interrelated so that their executives also meet midyear within their own association group. From such meetings these executives report both as units and as an association to the Bureau of Professional Education and Colleges, which reports directly to the Board of Trustees upon every aspect of osteopathic education. One of the profession's first concerns today is the maintenance of its standards of preprofessional and professional education, the ramifications of which flow over into legislation and licensure in every state. Final administration of the entire field of osteopathic professional education, and of its developing postgraduate education, rests with the Board of Trustees. This December session had much to do with these problems; some of these problems demand the most serious consideration.

Education in turn is also directly related to hospitals. Aside from the six directly college-connected hospitals, there are sixty-eight hospitals approved for intern training, twenty-six for residency training. Hospital evaluation is the responsibility of the Bureau of Hospitals which, like the Bureau of Professional Education and Colleges, is a component of the Department of Professional Affairs, in itself directly responsible to the Board of Trustees. A consideration of the report of the Bureau of Hospitals was an important part of the agenda of the Board.

History was made for the newly created Bureau of Research when it held its first meeting on December 13. This Bureau grew out of a merger of several research committees which for a long period have been responsible for the Association's research program; it was created last July by a directive of the House of Delegates and the Board of Trustees. The Bureau has already resulted in a more efficient management of the research projects of the profession. The report of the chairman of the Bureau was comprehensive in its scope and was another important concern to which the Board gave careful consideration and constructive criticism.

The reports of these Bureaus illustrate but three of the many important activities to which the Board of Trustees gave their studied consideration. Mention

should be made of the Department of Public Relations which presented a detailed and important communication on the status of our profession at the national level, including reports on legislative action, which is of such vital concern to every medical group and to all individuals within those groups. Reports of unassigned committees were heard, especially that relating to the Osteopathic Progress Fund, the continued success of which bears a direct relationship to our colleges and their very life. The Department of Public Affairs with its numerous bureaus explored every avenue of this profession in its relation to public health and public and professional welfare. The business affairs of the Association also come under this Department. Association business alone is equal to that of any large and growing commercial concern.

As provided by the Bylaws, the officers of the Association reported directly to the Board. The Executive Secretary pointed out among other things, in his characteristically trenchant survey of the profession midyear, that the membership figures show a steady improvement, so that trends at this early date suggest for 1952 the highest membership in the Association's history.

The report of the Treasurer revealed that the obligations of the Association are far-reaching in their scope, but that mounting costs have become a serious menace to plans for wider service to the profession at large. The Business Manager presented figures showing the problems involved as a result of greatly increased costs of publication, and the Editor reported on purposes and policies of the publications from the point of view of their further development and wider usefulness to the profession.

Plans for the Fifty-Sixth Annual Convention of the Association were reviewed by the Board which heard the report of the General Program Chairman. The program gives promise of being richly diversified and of interest to every professional group, so that the Atlantic City Convention in 1952 bids fair to be one of the best meetings of recent years.

This brief survey of the 1951 midyear meeting of the profession's administrative body is purposely made general in order that the osteopathic physician may gain some consciousness of the far-flung activities of his profession, although no single observation can in any way adequately accomplish this for the hitherto uninformed reader.

Even more significant than the affair at hand is the Board itself which with the House of Delegates, the main legislative body of the Association, constitutes the profession's implements for action. The personnel of the present Board is an excellent cross section of the osteopathic profession, comprising a wide sampling of osteopathy's varied interests. These members are neither more nor less than the profession—there are no meteoric figures in the group. There are other groups in the osteopathic profession which might be more colorful, in which the element of drama might be more readily discerned, or the concerted action more obvious; but make no mistake, this observer was confirmed by this additional period of observation in the judgment which he made last July of the Board and House: This is the osteopathic profession. Within this duly constituted authority (the House and the Board) and with it alone lies not only the authenticity, but the authority of the profession itself. Beside it, valuable as they may be in richness and variety of contribution, all other groups are fractions of the whole. Distinguished as they may be within themselves, their strength remains great because the Board and House alone tap the sources for a continuing professional life.

These sources are the men and women who are scattered throughout the nation, in countryside and village and great urban centers; in private offices, in clinics, and in hospitals; and who, taken together, contribute in a special manner to the health and welfare of a great sector of the American people.

For this total group, 12,000 of them, member and nonmember alike, the Board of Trustees of the American Osteopathic Association acted this mid-December, for four grueling days and many night hours. The results of that action, taken together, reveal a profession of authority and power, continuing a distinctive pattern of service to a great nation. Such is the significance for the individual osteopathic physician of this midyear meeting in Chicago, a meeting which may seem to have little concern with his immediate professional life, but which in reality makes it possible for him to say with pride—it is good to be an osteopathic physician and to say it with a high sense of security.

ATHEROSCLEROSIS AND THE AGING PROCESS

Man and his years are so intimately connected with atherosclerosis that the latter may be said to be synonymous with aging, although by no means limited to the elderly, and the aging process considered basically might well be called the atheromatous process. As the leading cause of death in America[1] atherosclerosis has become one of the major problems of medicine, especially since we are rapidly becoming a nation of elders with more than 11,000,000 persons aged 65 and over in the United States.[2]

The distinction between arteriosclerosis and atherosclerosis should be kept in mind, since the former is a general term including inflammatory forms of arteritis, while the latter refers specifically to intimal disease of the arteries.[1] The bibliography of atherosclerosis is voluminous and practically every medical school and teaching hospital in the United States is engaged directly or indirectly with research relating to the aging process. If one goes beyond the field of geriatrics in which atherosclerosis occupies such a prominent place, into the larger province of gerontology,[3] then the accumulated literature becomes monu-

1. Sachs, B. A.: Dietary cholesterol; its role in atherosclerosis. Am. Pract. & Digest Treat. 3:284-289, Jan. 1949.

2. Shock, N. W.: Trends in gerontology. Stanford University Press, Stanford, Calif., 1951, p. 5.

3. Book Notices: Trends in gerontology. J. Am. Osteop. A. 51:244, Dec. 1951.

mental in its mass, even though fundamental information on the aging process is only at the threshold.

In the United States and Canada seventeen large laboratories are doing primary research on aging, and there are more than twelve such laboratories in Great Britain and Europe. Taken in its entirety the approach to the phenomena and resulting problems of aging represents one of the most constructive and socially useful projects of the present day. Since the aging process finds its biological basis in atherosclerosis and in arteriosclerosis generally, scientific interest has long been in pursuit of the etiology of the vascular diseases which in themselves are pathognomonic of age.

It has become well established that atherosclerosis is a metabolic disease, due to disturbance in lipid, and specifically cholesterol, metabolism. It has also been demonstrated that man is practically the only mammal naturally subject to atherosclerosis, although the condition can be readily produced in experimental animals by feeding cholesterol, especially in the rabbit,[3] where the process is a reversible one and the animal can be cured. Induction of atherosclerosis in the rabbit is so readily accomplished because this animal has no physiologic mechanism for metabolizing dietary cholesterol.

Earlier research had proved that not only was cholesterol constantly present in crystalline-ester form in the experimental lesions of animals fed cholesterol —rabbits, chickens, and dogs—it was also present in the actual lesions of atherosclerosis in man. These lesions were found to occur at selective sites, which included especially the ascending aorta, the coronary arteries, and the cerebral, renal, and leg vessels.[4]

Out of these earlier studies grew the assumption that the level of plasma cholesterol correlated with the degree of vascular sclerosis; hence estimation of the total plasma cholesterol became a relatively popular clinical laboratory procedure. Inconsistencies were found, however, establishing the fact that such estimations were misleading as aids to an evaluation of vascular sclerosis. Studies centering around the total analytically determinable lipid constituents, that is, cholesterol or cholesterol esters were no longer considered significant. Their true significance had to wait on the recent work of Gofman and his coworkers[5] which was based upon the ultracentrifugal analysis of blood serum for its lipid-bearing constituents. This work established the fact it was not the total plasma cholesterol but abnormal cholesterol containing lipoproteins which were connected with the pathogenesis of atherosclerosis.

These workers produced a hypercholesteremia in rabbits by means of feeding, after which certain of the animals were found to have a series of cholesterol-bearing giant molecules of the S_f class 10-30. Prior to the high cholesterol feeding the concentration of the molecules was of the S_f 5-8 class and those rabbits which failed to develop higher levels after 15 weeks of cholesterol feeding showed no gross atherosclerosis or only minimal atherosclerosis. Those rabbits which developed severe atherosclerosis showed the presence in blood of components of the S_f 10-30 class of molecules. It was found that these are the molecules which are deposited in atheromatous plaques and are "a reflection in the blood of the metabolic abnormality which results in cholesterol-induced atherosclerosis." In other words, it seemed apparent that in the experimental animal molecules of the S_f 10-30 class are intimately involved in the production of atherosclerosis.

Studies were made of human sera in an attempt to find a correlation between the findings in the human and the rabbit. Human sera revealed that molecules of the S_f 10-20 class were analogous to the rabbit S_f 10-30 class and that in the former as in the latter, this class of molecules was connected with the atheromatous processes. Further, Gofman and his coworkers found out that more than 95 per cent of myocardial infarctions occur in individuals whose coronary arteries are atherosclerotic and that these patients also showed the presence of molecules in the S_f 10-20 class in measurable concentration.

Other findings relating to the S_f 10-20 class of molecules are meaningful. A measurable concentration of molecules was found to be consistently higher in males from 20 to 40 years than in females of the same age group. This is in agreement with the clinical fact that such males are much more likely to have demonstrable atherosclerosis than are the corresponding females. It was also found that many apparently normal individuals over 40 years tend to have definite concentrates of S_f 10-20 molecules in their serum, indicative that those individuals are developing atherosclerosis, although still clinically free. This same finding was present in diabetics, a disease in which atherosclerosis is notably found in early age. Gofman and his associates have apparently proved that cholesterol-bearing lipoproteins are correlated with excessive atherosclerosis in man, although they admit that whether or not its pathogenesis involves lipids as a primary etiologic agent is still a subject of considerable controversy.[6] Yet the fact remains that changes in the composition of arterial walls are coincident with the development of atherosclerotic lesions, and while the changes center around the deposition of cholesterol and cholesterol esters in the intima of the vessels, the source of the changes appears to lie in blood lipids which are transported to the vessel walls in the form of giant lipoprotein molecules.[7]

Since cholesterol and other lipids enter into the production of atherosclerosis the question arises as to the role of dietary cholesterol in the pathogenic process. Recent investigations are adding to the evidence that this sterol can be synthesized by many tissues in the animal body as well as being supplied from exogenous sources. Most recently authors are reporting that the artery is able to synthesize cholesterol and that the experimental animal will develop hypercholesteremia and atherosclerosis even when the diet

4. Blumgart, H. L.: Editorial: Blood lipids and atherosclerosis. Am. J. Med. 11:271-273, Sept. 1951.

5. Gofman, J. W., *et al.*: The role of lipids and lipoproteins in atherosclerosis. Science 111:166, Feb. 17, 1950.

6. Gofman, J. W., *et al.*: Lipoproteins and atherosclerosis. J. Gerontol. 6:105-119, Sept. 1951.

7. Jones, H. B., *et al.*: Lipoproteins in atherosclerosis. Am. J. Med. 11:358-380, Sept. 1951.

fed during the period of observation is practically devoid of cholesterol.[8] These authors suggest that the capacity of the artery to synthesize cholesterol may be of greater importance in the pathogenesis of spontaneous arteriosclerosis than has been previously considered.

The purpose of this brief review is to emphasize not only the role but also the complexities of cholesterol-lipoprotein-atherosclerosis, as well as to point out that blood lipids, especially cholesterol, are apparently the key factors in the pathogenesis of atherosclerosis. The significance of these scientific studies to the general practitioner, the clinician, and the internist lies in relation to the possible control of atherosclerotic development in the human. The question that immediately arises is whether such control will be found possible by dietary measures. Is the low-cholesterol low-fat diet a practical method of controlling or attempting to control the atherosclerotic process? Can aging be slowed down by attempting to change the dietary habits of a whole population? An examination of the recent literature on the relationship of the low-cholesterol low-fat diet to the development of atherosclerosis and arteriosclerosis is of great interest and suggests that some degree of control by dietary measures may be possible. If that be true, it means nothing less than beginning control of the aging process itself.

8. Siperstein, M. D., Chaikoff, I. L., and Chernick, S. S.: Significance of endogenous cholesterol in atherosclerosis; synthesis in arterial tissue. Science 113:747-749, June 29, 1951.

Department of Public Affairs

JOHN W. MULFORD, D.O.
Chairman
Cincinnati

BUREAU OF PUBLIC EDUCATION ON HEALTH

JOHN P. WOOD, D.O.
Chairman
Birmingham, Mich.

EXAMINING AND LICENSING BOARDS

The Forty-Third Annual Meeting of the Governors' Conference was held at Gatlinburg, Tennessee, from September 30 to October 3, 1951. In attendance were the chief executives of forty-five states, Alaska, Guam, and Hawaii.

The afternoon session of October 1 was devoted to a round table discussion of licensing boards and monopolies. Governor Sidney S. McMath of Arkansas presided. The whole subject of state control over the right to practice various professions and occupations was discussed. This subject is, of course, of particular interest to the members of the osteopathic profession because it is one of the professions whose practice is regulated by the laws which were under discussion.

State Government, The Magazine of State Affairs, published monthly by the Council of State Governments, 1313 East 60th Street, Chicago 37, Illinois, published in its November issue the following resume of the round table discussion of the Governors' Conference on this subject:

The danger of monopolistic and exclusionary practices by the many licensing and examining boards in the States provided the focus of discussion at this round table. Practically every state now has from twenty to thirty licensing boards which set qualifications, give examinations, and issue licenses to practice various professions and trades. Among these are boards for such occupational groups as accountants, architects, barbers, basic scientists, chiropodists, chiropractors, cosmetologists, dentists, engineers, lawyers, doctors, funeral directors, nurses, optometrists, osteopaths, plumbers, pharmacists, real estate dealers, veterinarians, egg dealers, insurance agents, and various others. In some States a significant number of trades and professions are forbidden unless a license is obtained from one of the State boards.

This situation, it was apparent in the round table, has raised some serious questions:

1. To what extent should various occupations be licensed? What does the public interest require?
2. To what extent does the prevailing system injure the right of an individual to work at the trade or profession of his choice?
3. How far should State government go in regulating occupations, and what is the effect on our democratic society?
4. How should State licensing boards be organized and administered to achieve responsibility and maximum efficiency?
5. Are we in danger of breaking down responsible democratic government by delegating major regulatory functions to agencies only indirectly responsible to the electorate?

As Chairman of the round table on licensing and examining boards Governor Sidney S. McMath of Arkansas outlined the nature of the problem. He called attention to the large number of these boards in the States and, by way of example, listed their great variety in Arkansas. Each of them, he noted, is relatively autonomous, and some are in danger of becoming monopolies. There is great lack of uniformity among the boards, as well as serious administrative inefficiencies, uncontrolled financial practices, and lack of responsibility to the Chief Executive, to the Legislature, or to the people.

Governor McMath described steps which might be taken to improve the organization of the boards. The administrative duties common to all boards could be performed more effectively and efficiently if they were properly consolidated. Monopolistic abuses might be minimized by the possible inclusion of lay membership and by enlarging the authority of the Governor and Legislature over licensing and examining functions. Finally, he observed that a number of States had solved the administrative side of the problem by organizing a separate department of licensing under a director appointed by the Governor and responsible through him to the Legislature and the people.

Discussion leaders included Governors William S. Beardsley of Iowa, Norman Brunsdale of North Dakota, Lee E. Emerson of Vermont, J. Brackken Lee of Utah, John Lodge of Connecticut, Earl K. Long of Louisiana, Okey L. Patteson of West Virginia, Val Peterson of Nebraska, Charles H. Russell of Nevada, and Fuller Warren of Florida.

It was pointed out by a number of Governors that consolidation had been effected in their States. In Illinois twenty-two boards covering various trades and professions had been consolidated into one department with a common organization for bookkeeping, office routine, enforcement, and investigation. The functions of the separate boards are limited to giving examinations, and it was reported that considerable savings had been achieved.

A similar step was taken in California where twenty-nine boards were consolidated into one department. Special commissions have been working on studies along this line in Alabama, Arizona, Connecticut, Iowa, Maryland, Minnesota, Michigan, Mississippi, and New Hampshire. Governors in a number of other States indicated their approval of such reorganization and stated that they would look toward the possibility of attaining it.

However, it appeared from the discussion that the administrative problem was minor in comparison to the major question of restraint on the right to work. One Governor described the degree of limitation imposed by regulatory boards upon the opportunity of an individual to engage in any field of endeavor in which he has training. He concluded by asking whether or not the Governors are doing their best to preserve for Americans their right to work without unnecessary restrictions and requirements.

It was pointed out that in the case of physicians, dentists, and other recognized professions dealing directly with public health and safety, licensing boards are necessary to set minimum standards and qualifications. The public thus not only is protected from dealing with untrained persons, but training and qualification standards can be raised over a period of time to higher levels with great benefit to the public welfare.

One Governor, commenting on the widespread increase of licensing boards, asserted that if we are going to license dishwashers and set up training qualifications for them on the theory that public health is affected, we can carry licensing to the point of absurdity. The question is, where do we stop? To this a suggestion was made that licensing boards be limited to the learned professions and to those skills which directly affect public health.

An eastern Governor called attention to the fact that the boards, once created, for most practical purposes become independent of the Legislature, the courts, and the people. As a result there may be a delegation of regulatory functions to agencies without direct responsibility to the elected representatives of the people.

The discussion was extended into the area of restrictions and restraints both by some labor organizations and by some managements. It was pointed out that in many cases young men may be trained for certain kinds of work but find, when they finish their schooling, that they must serve apprenticeships for as long as six or seven years.

Another Governor cited instances in which management followed what he termed a dangerous course. Certain producers he said want to retain the free enterprise system but also want "fair trade" for their particular industries; they really desire free enterpise for others but not for themselves.

The Governors found the pressures upon them for approving licensing legislation to be powerful and constant. In one State an act to license an occupation was vetoed by the Governor after three successive enactments by the Legislature. Upon passage the fourth time the Governor decided it was useless and signed the bill. Similar strong pressures by occupational lobbies were indicated in many other States with respect to various professions and trades.

The discussion resulted in a resolution directing the Council of State Governments to make an overall study of state licensing and examining boards. The resolution calls for a comprehensive survey of professional and occupational licensing practices, including standards, financing, and administrative procedures; also the policies which underlie the granting of licenses and the effects of delegating regulatory functions to agencies not directly responsible to the people.

As a result of this round table discussion upon the subject of licensing and examining boards the Governors' Conference adopted the following resolution:

The increasing trend toward State control over the right to practice various professions and occupations raises many serious questions:

(1) As to the extent to which government should determine the qualifications of individuals desirous of entering certain professions and occupations, and in limiting the practice of such professions and occupations to persons who meet those requirements;

(2) As to the extent to which fair competition is affected;

(3) As to the manner in which elective officials have effective control over the examining and licensing functions; and

(4) As to the administrative details of examining and licensing.

Therefore, the Governors' Conference requests the Council of State Governments to make a comprehensive survey of professional and occupational licensing practices in the several States, including standards, financing, and administrative procedures, and the extent to which professional and occupational licenses are required by Federal and local levels of government.

The Council of State Governments is also requested to prepare a study of the policies which underlie the granting of such licenses and the extent to which such policies are encouraging the delegation of regulatory functions to agencies not directly responsible to the people.

Book Notices

THE FACTS OF LIFE From Birth to Death. By Louis I. Dublin, Ph.D., Second Vice-President and Statistician, Metropolitan Life Insurance Company. Cloth. Pp. 461, with illustrations. Price $4.95. The Macmillan Company, 60 Fifth Ave., New York 11, 1951.

The author, who has spent more than 40 years working in life insurance, has had a rich opportunity to observe and study a wide range of facts relating to man's health and welfare. The Metropolitan Life Insurance Company, for which he is statistician, has use for such information in relation to its policyholders and has gone about collecting and correlating it over a long period. Furthermore this company has performed a noteworthy public service in making generally available the data it has assembled and compiled. The modes of dissemination have been many; probably the best known and most useful has been the monthly *Statistical Bulletin,* now in its thirty-second year.

"The Facts of Life" brings together in one volume and in highly usable form information on a number of subjects, including population, patterns of marriage and reproduction, the family, the sick and their care, mortality, various diseases, old age, accidents, suicide and homicide, occupational hazards, mental health, body build, the effects of war, and public health. The material is presented in question and answer form and is extensively and competently indexed; information can be quickly located and is succinctly presented.

This book provides entertaining reading for the factually curious and necessary information for those needing facts and figures pertaining to many phases of human welfare. It is an offering worthy of its able author and of the public-spirited organization by which he is employed.

AN ATLAS OF NORMAL RADIOGRAPHIC ANATOMY. By Isadore Meschan, M.A., M.D., Professor and Head of the Department of Radiology, University of Arkansas School of Medicine, and with the assistance of R. M. F. Farrar-Meschan, M.B., B.S. (Melbourne, Australia). Cloth. Pp. 593, with illustrations. Price $15.00. W. B. Saunders Co., West Washington Square, Philadelphia, 1951.

Despite the title this excellent text is not primarily a reference atlas; it is an atlas but it is much more. It is perhaps the first distinctive radiographic anatomy, combined with the information necessary, by means of positioning, to secure the structural shadows by which the desired anatomy can be visualized. This is done by the method of utilizing opposing pages. On the upper half of the left hand page the patient is shown positioned on a radiographic table, the particular part to be visualized placed in the proper relation to the tube target; on the lower half of the page is reproduced the roentgenogram in the negative. The reproductions are as clear as modern technic can make them without too much retouching. The upper portion of the right-hand page under the heading, "Points of Practical Interest in Reference to Figure —," gives precise and complete instructions on the method necessary to secure the proper position. The lower half of that page indicates very fully the anatomical landmarks to be visualized in the roentgenogram seen on the opposing page.

The above plan is carried out for all of the body systems. It is a teaching text and a compend of normal radiographic anatomy which confines itself to fundamentals, but it covers them adequately. It is highly recommended to the x-ray department of every one of our teaching hospitals, as well as to the isolated student of radiology who will need it as a consultative aid.

THERAPY OF DERMATOLOGIC DISORDERS Including a Guide to Diagnosis and a Dermatologic Pharmacopeia. By Samuel M. Peck, B.S., M.D., Dermatologist to the Mount Sinai Hospital, New York City; Associate Clinical Professor of Dermatology, Columbia University, New York City; Medical Director (R) Inactive U.S.P.H.S., and George Klein, M.D., Associate Visiting Dermatologist, Morrisania City Hospital, New York City; Acting Adjunct, Mount Sinai Hospital, New York City; Assistant Clinical Professor of Dermatology, New York Medical College. Cloth. Pp. 383, with illustrations. Price $6.50. Lea & Febiger, Washington Square, Philadelphia 6, 1951.

This book is divided into three parts, preceded by a section entitled "How to Use the Book." The arrangement is somewhat difficult to follow since four diagrams illustrating the usual localization of fifty-two diseases of the skin are included in the "How to Use" section while the table of differential diagnosis of the most common skin disorders, in which diseases are numbered to provide the key for the diagrams, is in Part I unaccompanied by any reference to the preceding diagrams. Understanding the relation of the diagrams and the table necessitates reading parts of pages 7, 12, and 14, and coordinating them requires shifting back and forth between pages 8 to 11 inclusive and pages 15 to 23 inclusive. It would seem that a simpler and more satisfactory make-up could have been devised. After the plan of the book has been mastered, much of value can be found within its pages.

Part II, "Classification and Treatment of Various Skin Disorders," provides coverage of most known skin diseases. Discussions touch upon etiology, clinical characteristics, and deal more extensively with treatment. Recommendations are concise and avoid controversial agents.

If one were to rely on this text exclusively for therapeutic suggestions, he would be likely to be confronted with a great many allergic reactions to penicillin and sulfathiazole ointment, for these two medicaments are suggested for use out of proportion to their place in any dermatologic armamentarium. The use of undecylenic acid (Desenex) and Sopronol is suggested more widely than is in keeping with clinical experience.

The most informative and best written chapter is that covering the eczema group and including allergic contact dermatitis. The explanation of patch testing is superb. Every student of the healing arts should be assigned this chapter for reading and rereading for an understanding of the technic of patch testing.

Part III covers dermatologic pharmacology most thoroughly—so thoroughly that much of the material would be applicable in only the most extensive of dermatologic practices. Some of the medicaments mentioned are so out of date that they would be hard to obtain, but the all-inclusiveness makes this text an excellent reference for determining the composition of preparations designated by eponyms, such as Castellani's paint fungicide, Dreuw's ointment, et cetera. The section on antihistamines is quite adequate.

The book is in most respects a better reference book for the specialist than a text for the use of the physician in daily practice.

A. P. Ulbrich, D.O.

GROWTH AND DEVELOPMENT OF CHILDREN. By Ernest H. Watson, M.D., Associate Professor, and George H. Lowrey, M.D., Instructor, Department of Pediatrics and Communicable Diseases, University of Michigan Medical School. Cloth. Pp. 260, with illustrations. Price $5.75. Year Book Publishers, Inc., 200 E. Illinois St., Chicago 11, 1951.

Because the writers' interpretation of growth and development includes both psychologic and physiologic maturation processes, this "graphic compendium" relates recent and basic knowledge from the broad fields of medicine, psychology, embryology, and genetics. Emphasis is on its usefulness to clinical practice, with discussion devoted to concepts rather than to therapeutic or diagnostic technics.

Originally begun as a text for undergraduate students in the Department of Pediatrics at the University of Michigan, the book was expanded to assist in preparation for specialty board examinations. Tables and charts in each section add value.

Chapter one presents briefly the principles of heredity and their modification by environment. Fetal growth, behavior, metabolism, and nutrition are traced as part of the thesis that growth is a unified process and, as such, begins at conception.

Methods of measuring physical, psychologic, and emotional growth factors vary widely, and the authors discuss several objective technics, including the Wetzel Grid which channels a child's development into a somewhat predictable pattern of individual normality.

The problems of the premature child are treated separately, as are normal development of the osseous, organic, and behavioral elements. The chapter on abnormal growth deals with dwarfism, organic disorders, giantism, and obesity.

Each chapter is enriched with references of recent origin and easy accessibility. The general physician should find this both a practical approach to pediatric concepts and an introduction to further study.

TEXTBOOK OF BIOCHEMISTRY. By Edward Staunton West, Ph.D., Professor of Biochemistry, University of Oregon Medical School, and Wilbert R. Todd, Ph.D., Associate Professor of Biochemistry, University of Oregon Medical School. Cloth. Pp. 1345, with illustrations. Price $12.00. The Macmillan Company, 60 Fifth Ave., New York 11, 1951.

Biochemistry as a basis for the understanding of living processes is so wide and rapidly expanding a science that seldom is the entire field covered comprehensively in a single book.

The authors of this new text discuss in considerable detail the principles and theories of biochemistry as well as those of physical and organic chemistry upon which biochemistry is based. Much experimental evidence is given to aid more complete understanding, to increase the student's critical judgment, and to stimulate his interest, as the authors state in their preface. Important facts are repeated throughout the book as they are reapplied to different biochemical processes.

References are extensive for both the historical and recent literature. Many charts, graphs, tables, illustrations, biochemical derivations, and discussion of research methods add clarity.

Physicians will find the chapters on enzymes and digestion, blood, respiration, salt and water balance, hormones, antibiotics, and nutrition most directly applicable to medicine.

HUMAN BIOCHEMISTRY. By Israel S. Kleiner, Ph.D., Professor of Biochemistry and Director of the Department of Biochemistry, New York Medical College, Flower and Fifth Avenue Hospitals; Formerly Associate, The Rockefeller Institute for Medical Research, New York. Ed. 3. Cloth. Pp. 695, with illustrations. Price $7.00. C. V. Mosby Company, 3207 Washington Blvd., St. Louis 3, 1951.

Rapid advance in biochemical knowledge and its clinical application has made necessary a third edition of this fine textbook within 6 years; the first edition appeared in 1945, the second in 1948.

"Human Biochemistry" presents, as concisely as is possible in so wide a field, discussion of biochemical principles, their dynamics in bodily processes, and their clinical application. It is an excellent and readable general text for the practitioner as well as the student who wishes a background for the expanding clinical uses of biochemical knowledge.

Recent researches have made clearer the processes of mineral metabolism and water balance in relation to pathologic dehydration, of blood coagulation, of vitamin A metabolism, of carbohydrate oxidation in muscle metabolism, and of enzyme participation, and these are included in this new edition. Additional illustrations and the rearrangement of some sections increase clarity. To supplement the brief discussions an expanded and revised list of references is given at the end of each chapter.

By no means, of course, is all of biochemical knowledge useful in clinical practice. The author, however, correlates applicable knowledge with the problems the physician meets in his office—problems such as membrane permeability in relation to salt retention and dehydration, and the role of hormones in the diverse metabolic processes and their application in therapy.

New research tools are discussed, among them the Warburg microrespirometer for evaluation of tissue oxidation, the radioactive isotopes as tracer materials, and paper chromatography in the separation of amino acids.

As a general, concise discussion of principles of biochemistry and a review of many recent researches, and for the purpose of gaining a broader understanding of biochemistry in relation to his practice, this book should appeal to the practitioner.

THE GREAT MEDICAL BIBLIOGRAPHERS. By John F. Fulton, Rosenbach Fellow in Bibliography, 1950. Cloth. Pp. 107. Price $4.00. University of Pennsylvania Press, 3436 Walnut St., Philadelphia 4, 1951.

This work is a worth-while addition to a field to which many extraordinary men have contributed. The author, a brilliant and distinguished scholar who has written numerous books on medicine and on bibliography and edited others, writes with contagious admiration for the patient men who have rendered invaluable service to the art and science of bibliography in the past.

The book falls into three principal chronological divisions. The first covers the period from the indices of the papyri and parchment rolls through the time of Conrad Gesner, who is called the father of bibliography; the second, the seventeenth and eighteenth centuries; and the third, medical subject indices.

While this book and its subject matter are of no practical value to the physician in his daily rounds and would be of no interest to many, it will provide those interested in medical history, reading, and libraries with much valuable background and information and a moving insight into the lives of those who have in the past given without profit so much of themselves to preserving and making available medical knowledge. It also will provide an opportunity to observe the work of a present-day master.